AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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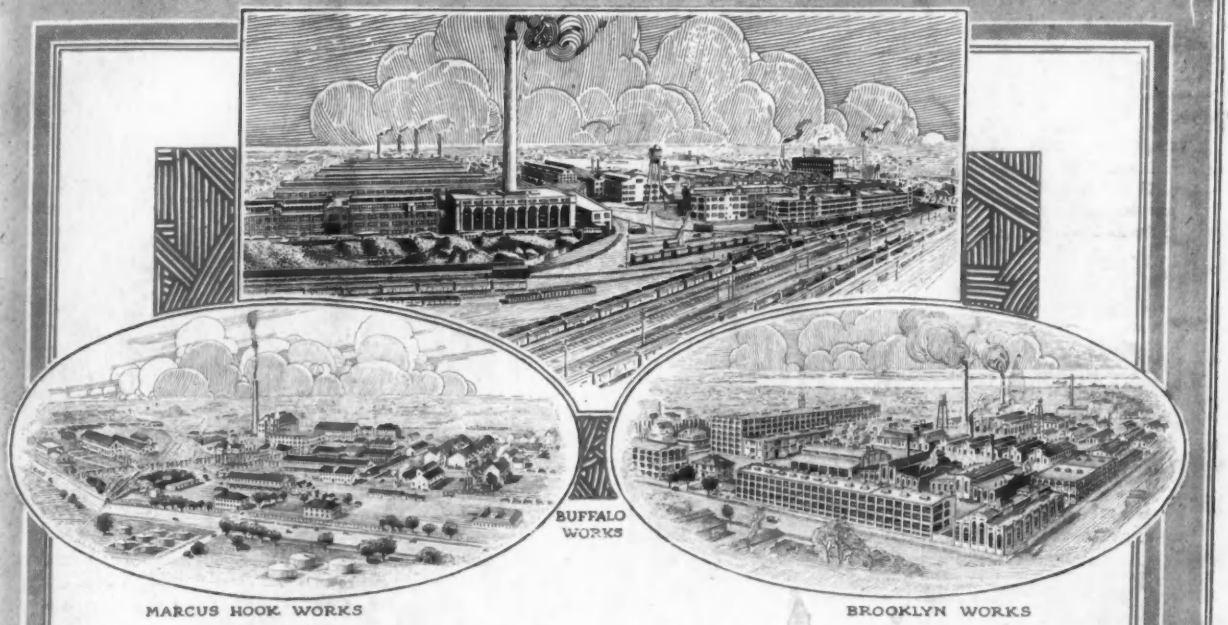


MARCUS HOOK WORKS

BROOKLYN WORKS

Hosiery Black

TWO of the most important qualities in dyes for hosiery are fastness to perspiration and fastness to washing. These qualities are insured by

"NATIONAL" DIAZINE BETA BLACK N

—a dye that has proved indispensable for quality hose.

National Aniline and Chemical Co., Inc.

General Offices

21 Burling Slip **New York**

Southern Office
236 West First Street, Charlotte, N. C.

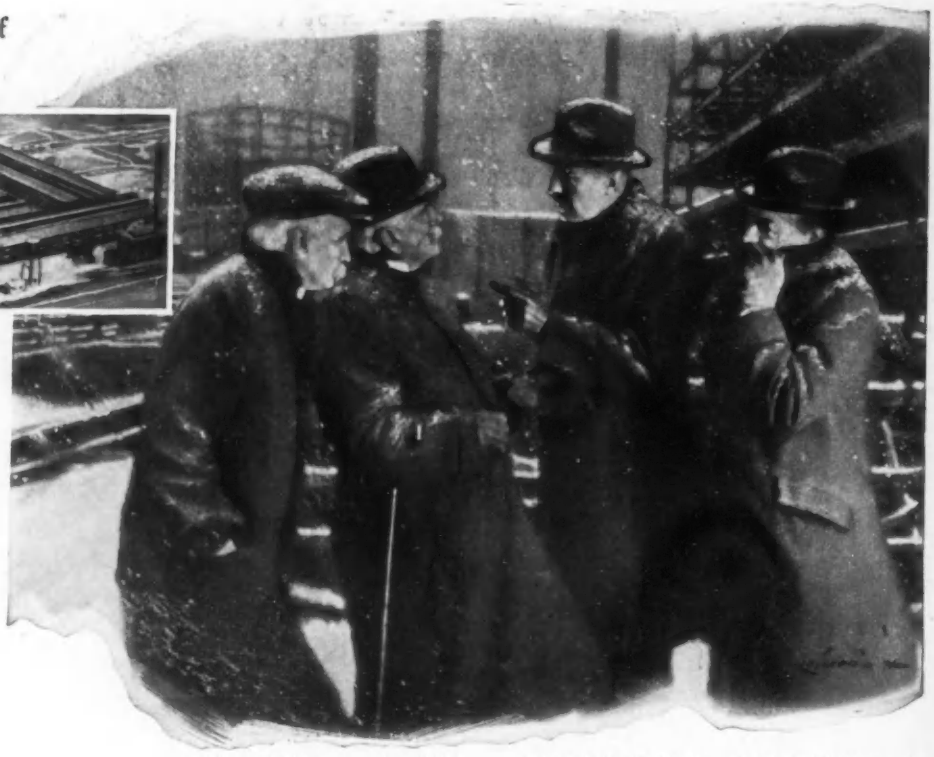
NATIONAL U.S.A. DYES

Table of Contents page 49. Advertisers' Index, page 296. Buyers' Index, page 284

Dramatized Facts out of The Day's Work
No. 2

Where the Facts Came From

Airplane picture of Youngstown Pressed Steel Company plant at Warren, O., where Grinnell Company installed eight different piping systems totalling nearly 35 miles in length. McCann-Harrison Co., Cleveland, O., consulting engineers. The circumstances of installation were similar in practically every respect to those in the Eskimo incident related below.



PLANT ENGINEER PRESIDENT CONSULTING ENGINEER PRODUCTION MANAGER

A fine job for Eskimos

"Brr-rr! Who ever called this the Temperate Zone, with a January snowstorm in November!" The Plant Engineer beat his arms across his chest to keep warm.

"We'll never get into production before April," growled the Production Manager.

The President interrupted sharply—"We've got to or face a big bunch of cancellations."

Consulting Engineer: "By February First this building will be enclosed and the piping contractors can get in."

The Production Manager wheeled around. "Not 'til then? You realize, of course, that the piping is the most important part of our equipment."

Plant Engineer: "And the biggest part! Over twenty-five miles of 1½" pipe in coils—besides miles of compressed air lines to steel presses, fuel oil piping to furnaces, acid piping to pickling vats, live steam, hot water, cold water, power piping, naphtha piping and all the miscellaneous work."

"I'll say it's big," interjected the President, "the estimates run about $90,000. The piping contractors have got to get the job finished somehow so we can start up the day the glass is in these windows."

"Only an Eskimo could pull a wrench here in January," facetiously remarked the Plant Engineer. "My repair men can tell you what it is to fix up leaky joints on winter nights and Sundays. And this kind of piping work takes keen Caucasian brains, close measuring to blueprints, accurate cutting and threading, straight lines and the perfect adjustments of real workmanship. It simply can't be done outdoors in zero weather."

President: "What kind of antique methods are you talking about? Most of that work should be done indoors beforehand, the way we have been fabricating steel for buildings for twenty years."

Quick on the trigger the Consulting Engineer turned. "That's just what I've been waiting for. Give all seven jobs to Grinnell Company — the one organization that shop-assembles piping systems and sends them to the job ready for quick erection."

President: "I'm sold. Gain a month's output and our profits will almost pay for the whole piping job."

GRINNELL GUARANTY

A Grinnell Industrial Piping Installation always starts with the fullest understanding of the service expected. Three thousand employees in eight great fabricating plants, working to blueprints, send sections of industrial piping equipment to 1300 road men, who fit them into the building like blocks into a child's puzzle.

Such modern engineering must be practical as well as creative, for on its soundness Grinnell Company places a guaranty—*a courageous guaranty behind ideas, men and materials.*

GRINNELL
INDUSTRIAL PIPING
Automatic Sprinkler Systems, Heating, Power and Process Piping
Your kind, their kind, every kind of Piping

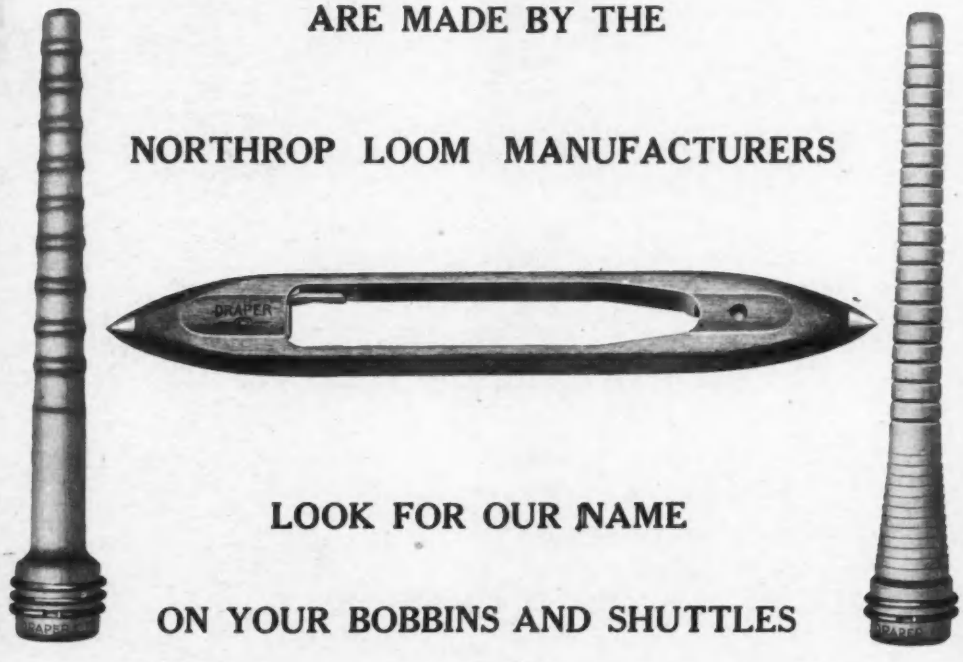
Send for our booklets, "Five Factors in Heating Costs" and "Standardized Sizing." The latter tells how the efficient, simply operated Constant Level Size Circulating System increases production in weave mills and pays for itself in size saving, time saving and the elimination of the spots, hard and soft-sized warps, the most frequent causes of "seconds". Address Grinnell Co., Inc., Executive Office, 301 West Exchange Street, Providence, R. I. *Fabricating Plants:* Charlotte, N.C., Providence, R.I., Atlanta, Ga., Warren, O

THE BEST
NORTHROP LOOM
TRADE-MARK REG. U. S. PAT. OFF.

BOBBINS AND SHUTTLES

ARE MADE BY THE

NORTHROP LOOM MANUFACTURERS



LOOK FOR OUR NAME

ON YOUR BOBBINS AND SHUTTLES

DRAPER CORPORATION
HOPEDALE MASSACHUSETTS

SOUTHERN OFFICE
188 SOUTH FORSYTH STREET ATLANTA GEORGIA

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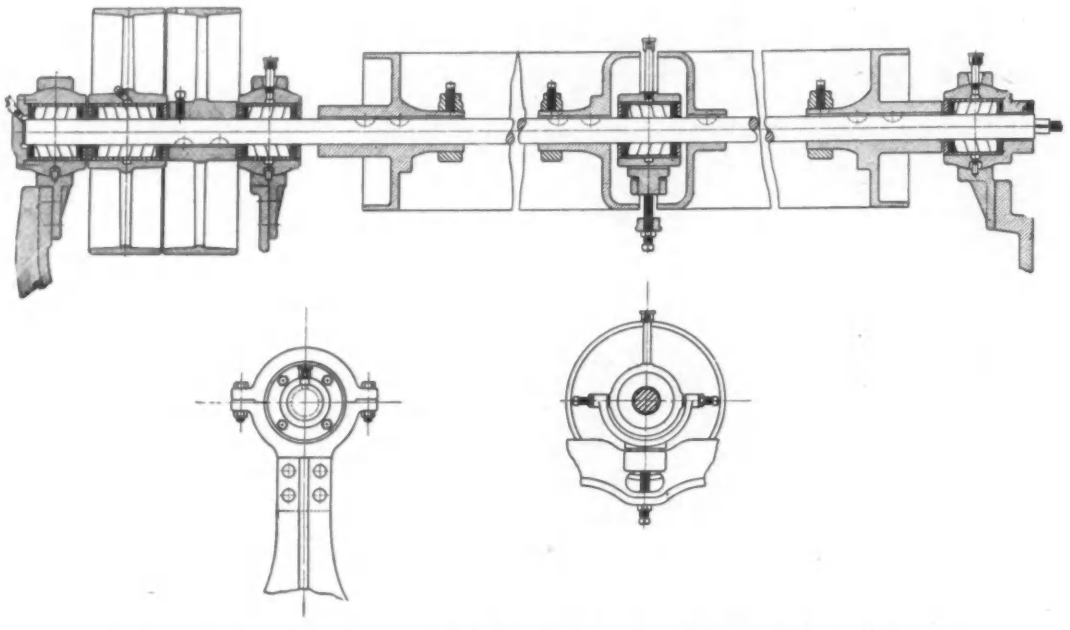


Typical designs of Hyatt Roller Bearing equipped cylinder shaft boxes for spinning frames and twister boxes

Hyatt Roller Bearings on Spinning Frames Save Their Cost in 18 Months

In addition to the worth while power saving secured by the use of Hyatt Roller Bearings on spinning frames and twister frames there is a real saving in lubrication costs.

Assume that it costs you 10c per day per plain bearing frame, oiling twice daily, including price of oil and time of oiler. Based on a 5-day week it costs you 50c per week or $26.00 per year to oil one frame.

Hyatt Roller Bearing frames will be perfectly lubricated if oil is added once in two weeks (usual practice is only four times a year), which means that the Hyatt Roller Bearings will require oiling only 1/20 as often as the plain bearings; 1/20 of $26.00 is $1.30, or a saving of $24.70 per year per frame.

The cost of having Hyatt Roller Bearings applied to your present frames or to new frames is about $35.00 per frame. Thus the Hyatt Roller Bearings more than pay for themselves in 18 months in oil saving alone.

And there are years of dependable power saving, oil saving operation yet to come. It will pay you to specify Hyatt Roller Bearings for any new spinning or twister frames and have them applied to your present frames. Ask us for further information on this proposition.

Hyatt Roller Bearing Co., New York, N. Y.

"MY BOSS IS ON THE SQUARE!"

THAT'S what they should be thinking. That's what they must continue to think. *More than 90% of workers are loyal employees.*

But you must not have them *think it is so—it must be a FACT.*

BE square with your workers, but make them realize that you are square. Unless you do, production will constantly worry you—unless they know, *unless their viewpoint is right*, you and they will be losers.

If workers think right, they act right. There is only one thing they must know:

"It is work well done that determines earning power!"

The very best of wages, working conditions, hours of labor, and everything else, will not maintain peak-production unless your working people *think right.* This has been proven to your complete satisfaction these past two or three years.

What are you going to do about it? What's coming next?

You want them to understand and the way must be found *to reach THEM—they must think and act right!*

The workers in the Shermanized Mill know and sympathize with the reasons for wage reductions. They are made to think right, to act right, to co-operate. They know that their boss is on the square—they know what to do. They fully realize that it is what a worker does in work well done that brings about prosperity.

Let us show you what we are doing for others. We feel sure you will realize that it is an investment that will very shortly pay big dividends.

Write our nearest office on your business letterhead requesting our literature, or, better still, tell us when we can have a conference.

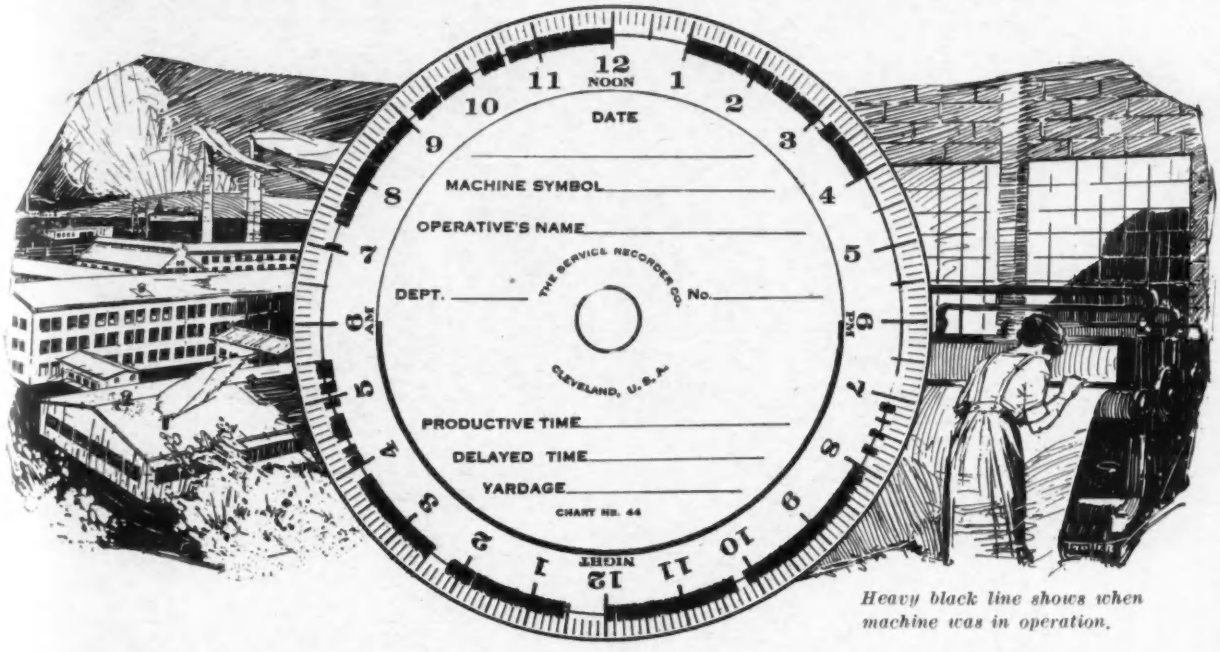
SHERMAN SERVICE INC.

Production Engineering
Industrial Co-ordination

New York, 2 Rector St.
Cleveland, Park Building
Pittsburgh, 401 Wood St.
Chicago, 208 So. La Salle
Detroit, 73 State St.
Philadelphia, 1211 Chestnut St.
New Haven, 42 Church St.
Kansas City, Reliance Bldg.
Boston, 10 State St.
Providence, 10 Weybosset St.
St. Louis, 314 No. Broadway
Toronto, 10 Adelaide St., East
Montreal, Drummond Bldg.

Largest organization of its kind in the world.
Founded April 7, 1910.

SHERMAN SERVICE



Heavy black line shows when machine was in operation.

Important Announcement–

A "Time Clock" For Textile Machinery

MILL executives can now get a clear and exact record of the productive time of practically all types of textile machinery—and with little trouble or expense.

This written record on a twenty-four hour dial chart, however, does more than tell the total running time and total idle time of a given piece of machinery—it tells **when** the machine was in operation—**when** it stopped—**how long** it stopped — **when** it resumed work again.

The Recorder Described

The Servis Recorder is the same instrument that is in successful use on many thousands of motor trucks throughout the country.

To call it an instrument is to call it by too long a name. It is simplicity itself. A clock movement that turns a chart, and a "swinging stylus" that marks it. And of course, a metal case to hold these simple parts. Everything is enclosed.

On textile machinery the Recorder is merely hung on at any convenient place where it can get some of the motion of the machine. No need to figure out speeds, revolutions, etc. No allowances or calculations to make.

How It Helps the Textile Manufacturer

Already there are hundreds of these little Servis Recorders in New England textile mills. They help in many ways. For instance, a certain New England mill reduced its hours from nine to eight per day. Of course, they expected production to fall off, but would it decrease relatively more than the reduction of hours? The Servis Recorder, attached to several machines, showed to their surprise that less work was being done **per hour** when the work day was shorter.

The management had the facts, scientifically obtained. They were able to proceed and revise wages, and in many departments change over to piece work. Incidentally the operators earned more money, but they gave value received.

In another case a new mill was equipped with machinery from three other mills, the machinery being found available after studies based on the Servis Recorder charts.

The applicaion of his Servis Recorder to such machines as tenter frames, etc., in card rooms, as well as spinning frames, warpers and looms, has given the first fundamental record of actual operations which has been easily available.

A Wide Field

For the purpose of analysis and comparison with 100 per cent possibilities, the use of the Servis Recorder has a wide field. It is useful not only for mill executives but for consulting and industrial engineers who need a record of such data.

We will be glad to send you the literature.

The Service Recorder Company, Cleveland, Ohio

Southern Representative:—Greer & Co., Greenville, S. C.

THE SERVIS RECORDER

From The Editorial Page Of "Power" January 18, 1921

What Does a Pound of Babbitt Cost?

To ask what is the most expensive part of a machine would seem strange perhaps, but a very definite answer to such question can often be given. The part that wears out, breaks or gets out of adjustment most often is unquestionably the most expensive part.

Babbitt metal is quoted variously according to grade and local market. But whether it be fifteen cents or fifty cents a pound makes relatively little difference in the last analysis, for the cost of the metal itself is but a small part of the cost of a bearing for which it may be used. When one adds together metal cost, labor of casting and the cost due to loss of service from the equipment or machine while undergoing repairs, it is evident that the babbitt once in place may literally be "almost worth its weight in gold."

A breakdown once in a while is to be expected. A repetition of such a break from the same cause requires careful investigation. A third break or frequent repetitions of interruption from a single cause represent something worse than a bad habit. The part, the machine or the man that is to blame has to change or be eliminated. Permanently, such part or man is too expensive at any price.

When figuring costs of maintenance or repair, all these factors must be taken into account. As in public utility service, so also in individual power plants, continuity of service is, next to safety, a prime requisite. Anything that prevents regular service creates expense—not only the direct cost for a new part, but also the cost of its installation and the still greater element of expense, the loss of production during interference with the machine.

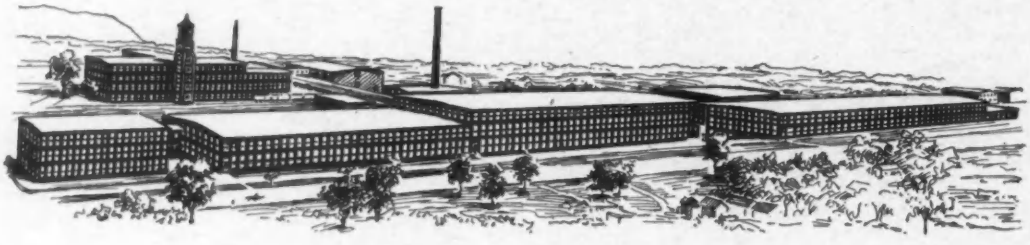
HYATT BEARINGS

"Power" Is Right!

When Hyatt Line Shaft Roller Bearings Are Used
The First Cost Is The Last Cost
Because Load Carrying Parts Are Of Finest Steel

HYATT ROLLER BEARING COMPANY, NEW YORK, N. Y.

FOR LINE SHAFTS



A Sermonette to the Textile Industry, with REGAIN as a Text

In no other industry are profits or losses more affected by invisible air conditions.

The Silk Industry years ago first recognized the need of a fixed relation between the actual amount of silk and water involved in a sale. The high price of the raw material naturally enough encouraged this in order to prevent abuses. Now, other textile materials, while of low values per pound are being manufactured in such large quantities in individual mills that the opportunity for loss or gain is fully as great as in the silk industry.

Water is always present in textile materials. It is to the seller's interest to have the amount large. It is to the buyer's interest to have the amount small. These conflicting interests demand a standard called regain, to prevent business friction. These standards are now so well established that the mill shipping goods at less than accepted regain is merely unjust to its stockholders.

Humidity and its application to your problem is a genuine science. Unscientific humidity will not give the results. Get the very best you can buy.

Parks-Cramer Company

Engineers & Contractors

Industrial Piping and Air Conditioning

Fitchburg Boston Charlotte

CUTTER LIGHTING EQUIPMENT FOR STORAGE, LOADING PLATFORMS AND YARDS

GOOD LIGHT MEANS SAFETY AND ECONOMY

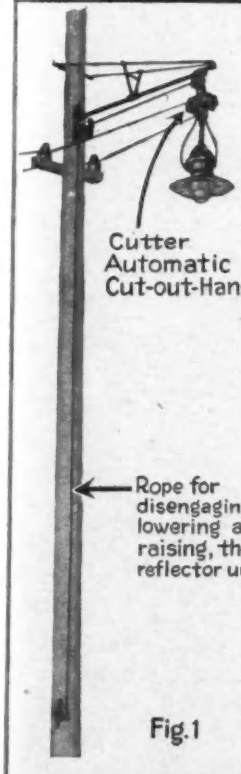


Fig.1

Pole With Mast Arm

Good light in storage and loading yards is a great aid to the workmen. It increases their capacity for greater and better production. It facilitates efficient handling of stock. Furthermore, plenty of light is the real watchdog for guarding your employees and property against theft and danger that lurks in darkness.

In Cutter lighting equipment you will be assured a low initial cost of installation, and, due to its facilities for easy cleaning and renewals, your lighting system can always be maintained at a high standard of illuminating efficiency.

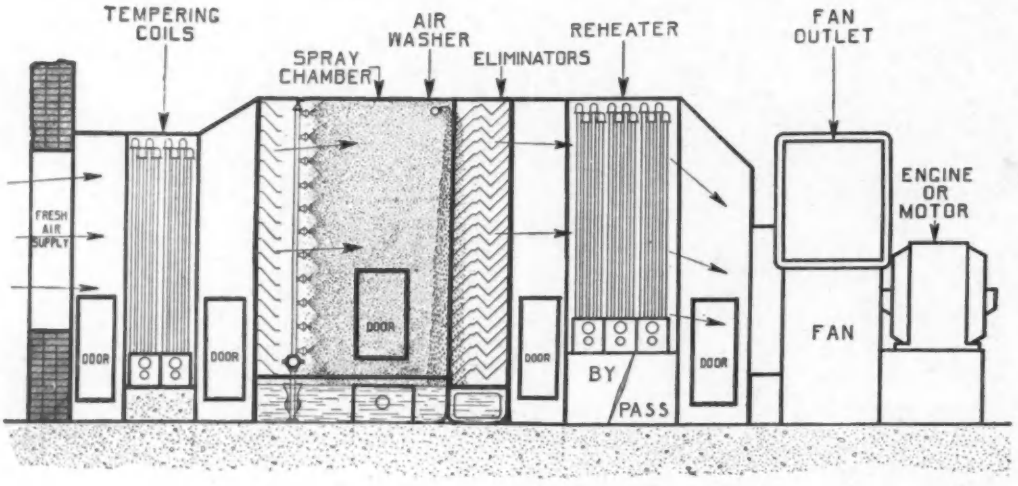
Do you have any lighting problems? If so, call our nearest district office or write our Illuminating Engineering Bureau.

Westinghouse Electric & Manufacturing Co.
George Cutter Works
South Bend **Indiana**

Westinghouse

Fig.2

Platform Crook With Dome-Type Holder-Socket-Reflector.



Typical Sturtevant Heating, Ventilating and Air Conditioning System.

10 Reasons Why Air Conditioning

will speed up your production and profits

1—Standardizes manufacturing processes.
2—Eliminates moisture surrounding product.
3—Eliminates static electricity.
4—Regulates the amount of moisture in the finished product.
5—Materials dried irrespective of weather conditions.
6—Accelerates and standardizes the sprouting and growth of plants.
7—Cools or heats temperature to suit manufacturing process.
8—Air is washed and kept dust and gas free.
9—Maintains constant air conditions where delicate tests are made.
10—Hastens the oxidation of paints and varnishes.

B. F. Sturtevant Company, for over sixty years specialists in Putting Air to Work, are originators. leaders and largest producers in their field, which includes the production of Air-Conditioning Apparatus. Together with the W. L. Fleischer engineering and construction organization we manufacture and install these systems. As "air specialists" and "doctors of climate" Sturtevant apparatus plus F. L. service will cure—economicallv and efficiently—all conditions of "sick" air. Scores of industrial plants have already benefited from the services of our "climate doctors." Manufacturing supremacy awaits now—the cotton manufacturer first to utilize this science in air conditioning.

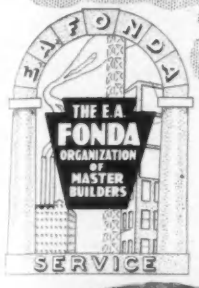
Request our representative to call. Catalogue and "The Climate Doctors" (a proof story of air conditioning with illustrations of successful installations) will be mailed to you. Where? Write today.

Engineering Service

Air conditioning systems designed, plans and estimates submitted without obligation on your part. 22 Sturtevant engineering service stations conveniently located in all the leading business centers.

B. F. STURTEVANT COMPANY
HYDE PARK, BOSTON, MASSACHUSETTS
AND ALL PRINCIPAL CITIES.

"--a more satisfactory building at several thousand dollars less cost."



The following letter is one of many in our files and is just an indication of the reputation which we have among all of our clients:

"Mr. Fonda made possible the erection of our $100,000.00 Apartment House by effecting our financial arrangements, assisting our architect in redesigning the structural plan and producing for us a more satisfactory building at several thousand dollars less cost. Through his knowledge of effecting purchasing and working organizations he made additional savings to our personal observation which amounted to many thousand dollars. We found Mr. Fonda entirely trustworthy, dependable and a man who knows his line of work.

Mr. Fonda has directed several very large construction operations for some of my personal friends who all speak highly of his energy and ability. During the past year his operations in this vicinity went well past the million dollar column."

(Signed) D. L. MERIWETHER, Asheville, N. C.

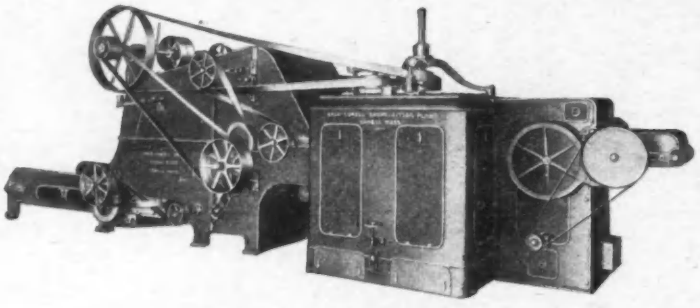
Fonda Service is not an architectural service, nor is it merely a building service, but a constrcuitve service in which the whole heart and soul of the Fonda Organization is working—fighting to save you money and yet produce the most efficient and perfect construction that is humanly possible. And when the construction is turned over to you, you can feel sure that it could not be duplicated at a lower cost—and you will realize why **"Master Builders"** is a part of our name.

Full details of Fonda Service should be in your files for future reference. Estimates gladly furnished on any building or construction, no matter how large or how small. Write us today.

The E. A. FONDA ORGANIZATION of MASTER BUILDERS

GREENVILLE, S. C.
CHARLOTTE, N. C.

SACO-LOWELL SHOPS
TEXTILE MACHINERY
INCLUDING
OPENING CONVEYING AND DISTRIBUTING EQUIPMENT



VERTICAL OPENER COMBINATION

Proper opening and mixing of the cotton increases production and enhances quality. The installation of the equipment illustrated contributes largely to the securing of such results.

SHOPS AT
LOWELL, MASS. NEWTON UPPER FALLS, MASS. BIDDEFORD, ME.
Executive Offices, BOSTON, MASS.
ROGERS W. DAVIS, Southern Agent, CHARLOTTE, N. C.
Southern Branch Office, GREENVILLE, S. C.

THE SIMPLEST AND THE MOST ELABORATE

FABRICS

Are produced on

LOOMS

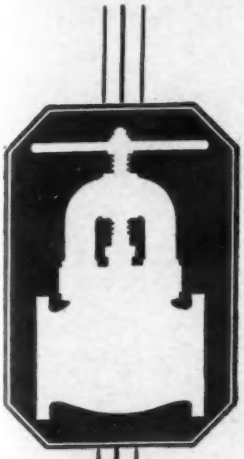
From the

Crompton & Knowles Loom Works

WORCESTER, MASS.

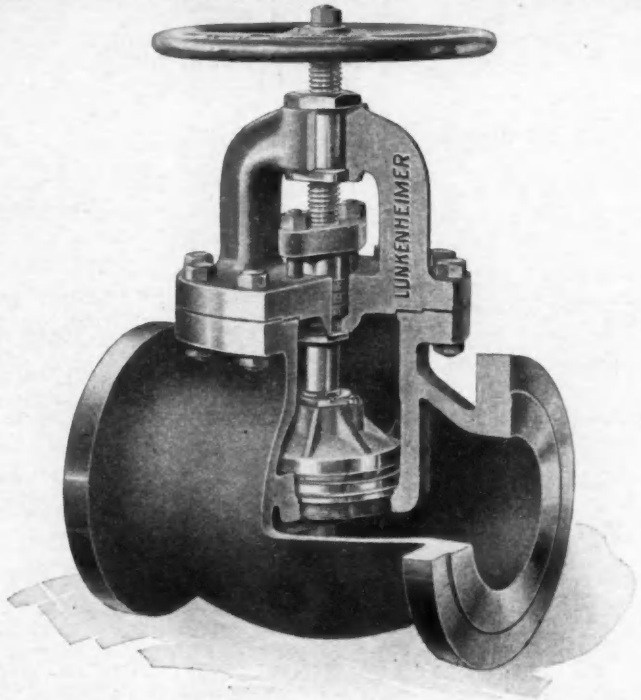
Providence, R. I. Paterson, N. J. Philadelphia, Pa.

Alexander & Garsed, Southern Representative, Charlotte, N. C.



LUNKENHEIMER

Globe, Angle, Cross and Check Valves



Maximum service with a negligible cost for upkeep is the performance record of LUNKENHEIMER Iron Body Valves, and has led to their adoption as "standard equipment" in leading industrial plants.

Correct design, LUNKENHEIMER materials and the LUNKENHEIMER method of manufacture are the basic factors which determine their success, and the high degree to which these factors are combined is demonstrated by the exceptional results obtained by users in every class of service.

The broad scope of the LUNKENHEIMER line embracing valves for 125, 175 and 250 pounds working steam pressure; in Screw or Flange Ends; with or without by-pass, covers every valve requirement.

The LUNKENHEIMER Distributor in your locality carries a complete stock for immediate delivery. Acquaint him with the conditions of operation in your plant. This knowledge will enable him to anticipate your requirements, preventing delay and possible shut-down when an emergency arises.

STANDARDIZE ON LUNKENHEIMER IRON BODY VALVES.

THE LUNKENHEIMER CO.

"QUALITY"

LARGEST MANUFACTURERS OF HIGH GRADE ENGINEERING SPECIALTIES IN THE WORLD

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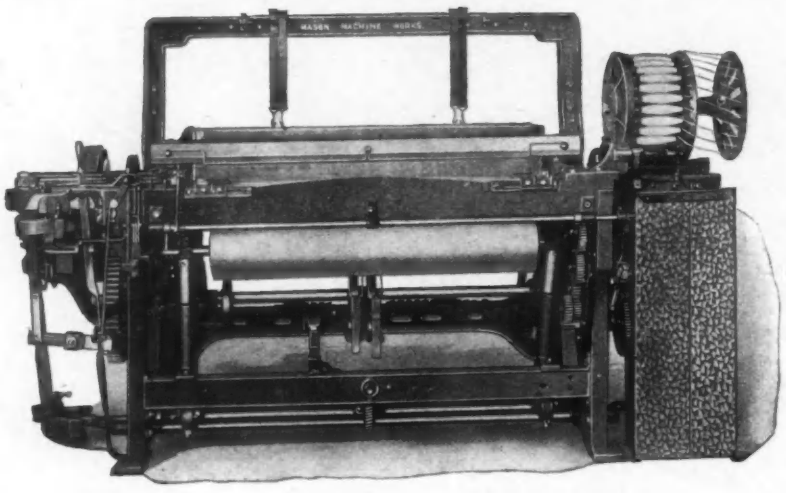
Mason Automatic Loom



With Battery, Warp Stop Motion, Feeler and Shuttle Lock

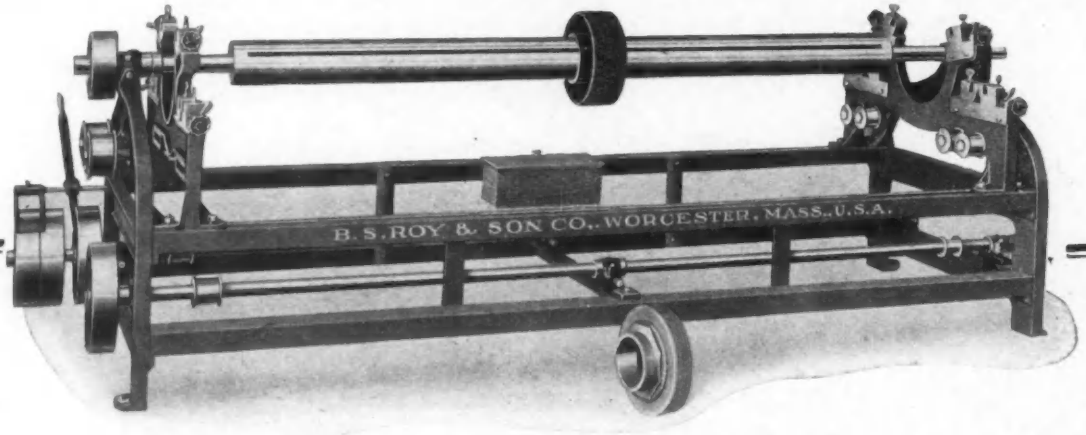
RANDOLPH CROMPTON'S PATENTS

Fewer Parts Standard Construction Rebounding Shuttles Overcome
Damage to Bobbins and Shuttles Prevented

We also build Revolving Flat Cards; Drawing Frames, Ring Spinning Frames; Duck Looms in various widths and weights; Silk Looms—Single Box and Two Box; Wide Sheeting Looms.

Mason Machine Works Co., Taunton, Mass.

E. HOWARD, Southern Agent, Greenville, S. C.



Lengthening the Life of Cards and Rolls

For years in the leading mills of the United States and many foreign countries Roy Grinders have been prolonging the lives of Cards, Nappers, Garnetts, and Calender Rolls.

They have enabled these machines to give satisfactory service not merely for the first week or month but year after year.

Write for Descriptive Bulletins.

B. S. ROY & SON CO., Worcester, Mass.

Established 1868

E. M. TERRYBERRY, Southern Agent, 1126 Healy Bldg., Atlanta, Ga.

GREIST

Superior Finish Spinning Rings

"What would be the qualifications of an ideal Spinning Ring?" we recently asked a number of mill superintendents. Every requirement they gave is met by Greist Spinning Rings. You can see for yourself, in a comparative test, the advantages gained by their special features.

Greist Spinning Rings give you increased speed and longer service. Friction has been reduced to the minimum—by the use of the hardest type of steel that can be made, perfected by the exclusive Superior Finish. The breaking-in period is greatly reduced. Greater clearance has been obtained for the yarn between the traveller and the ring by the curved, inclined flange. The single flange feature is now approved in mills because the old style, double flange rings usually rust before they are turned.

The perfection which has been achieved in the Greist Spinning Ring is the result of specialized experience in mechanical work. The Greist Manufacturing Company are the foremost manufacturers of sewing machine attachments in the world. Our enormous facilities guarantee expert production and prompt delivery. Send for samples.

Also Greist Ring Holders

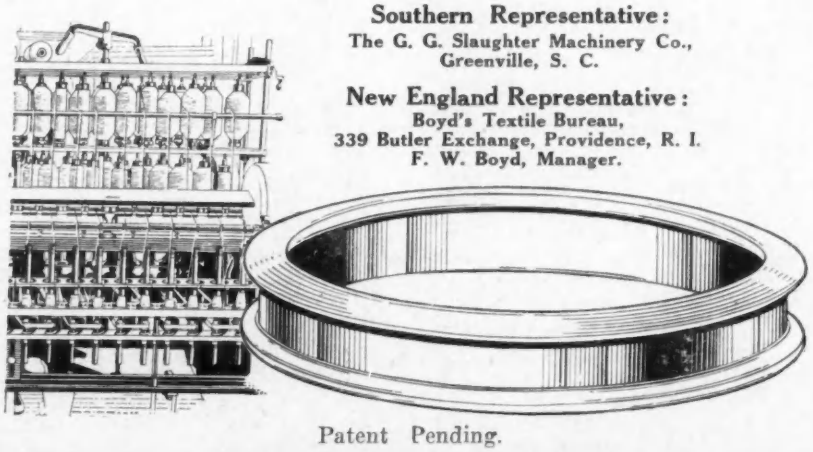
In standard types of design: Plate Holders (with Rust Resisting Finish), Cast Iron Holders and Aluminum Holders

THE GREIST MANUFACTURING COMPANY

New Haven, Dept. C. Connecticut

Southern Representative:
The G. G. Slaughter Machinery Co., Greenville, S. C.

New England Representative:
Boyd's Textile Bureau, 339 Butler Exchange, Providence, R. I. F. W. Boyd, Manager.

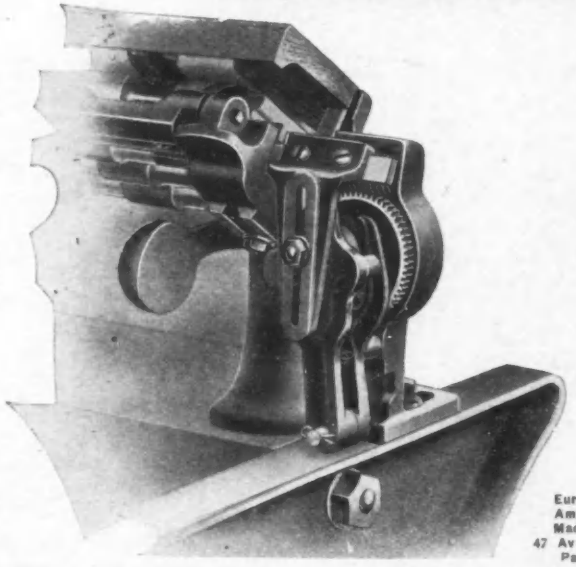


Patent Pending.

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



The Efficiency and Durability

of

LEATHER TOP-ROLLS

are increased by the use of the

WHITIN

VARIABLE TRAVERSE MOTION

All Whitin Ring Spinning Frames are equipped with this device.

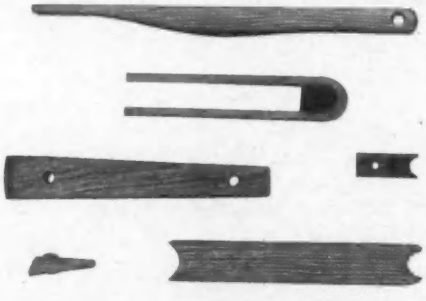
European Agency: American Textile Machinery Corp., 47 Avenue D L'Opera, Paris, France.

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.

GOOD LOOM SUPPLIES



THAT SAVE TROUBLE

Properly seasoned and properly sawn Hickory is what we use in making our line of guaranteed supplies. The result is that our supplies overcome most of the trouble usually experienced with parts of doubtful quality.

Lug straps, lug sticks, binders, parallel blocks, picker sticks, cloth roller blocks, pitman arms, pick levers, etc.—all of these parts we make with the same care and exactness. Ask for samples and our latest prices.

Southern Bending Company

Johnson City, Tennessee

CLEAN FLOORS

Save $12,000 a Year

for One Concern

One textile mill found that CLEAN FLOORS maintained with the use of Finnell scrubbing equipment saved $12,000 a year *in wages alone.* Besides this, numerous other economies resulted. There was less waste of material, less spoilage of merchandise and greater productivity due to the improved morale of employees.

Another mill saved $1860 annually in the same way.

Still another saved $680 a year on a small investment.

Thousands of Finnell System users are saving vast sums every year on investments ranging from a few hundred dollars up. Some of them have been Finnell System users for twelve years. Several have completely worn out their original equipment and are now having their second outfit.

The Finnell System of Power Scrubbing has long ago passed the experimental stage. It is an established success.

Finnell equipment is made in sizes to fit all needs. Prices are convenient for any purchaser. Requests for information are welcome and imply no obligation. *Write today.*

AMERICAN SCRUBBING EQUIPMENT CO.

Also manufacturers of Finola Scouring Powder

General Offices: 188 N. Wabash Ave., Chicago Factories: Hannibal, Mo.

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BOSTON	CINCINNATI	INDIANAPOLIS	MILWAUKEE	NEW YORK	PROVIDENCE	SEATTLE
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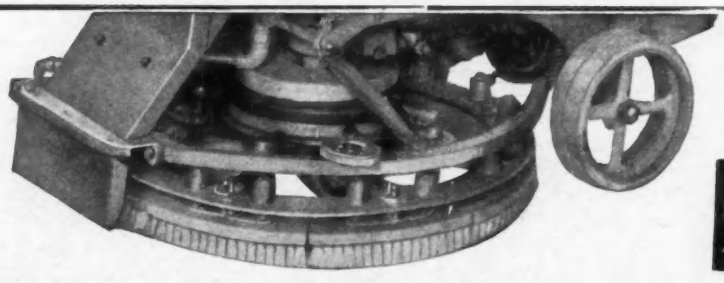
FINNELL SYSTEM

OF POWER SCRUBBING



FINNELL SCRUBBER

It **SCRUBS** *Electrically!*

Howard Bros. Mfg. Co.

Established 1866

Atlanta, Ga. Worcester, Mass. Philadelphia, Pa.

CARD CLOTHING

Napper Clothing

Wire Heddles
Cylinder Fillets
Doffer Fillets
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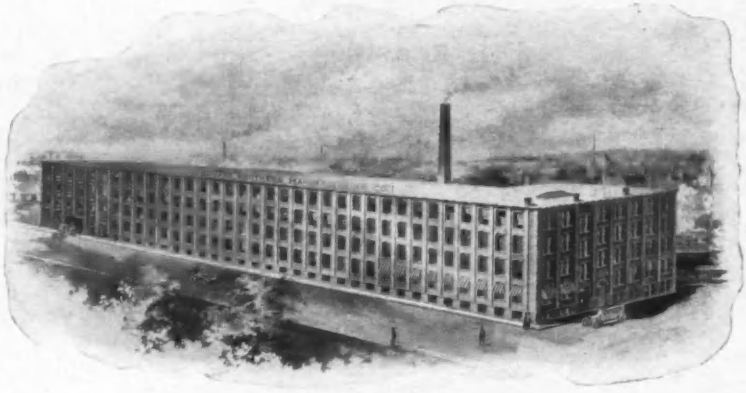


Hand Stripping Cards
Stripper Fillets
Burnisher Fillets
Emery Fillets

Southern Agent

E. M. TERRYBERRY, 1126 Healey Building, ATLANTA, GA.

Shambow Shuttles

RE-INFORCED with Red Vulcanized Fibre will outwear the best plain wooden Shuttle two in one and increase loom production and maintain, if not actually improve, quality. They will prevent an end an hour per loom from going down. Figure this out in additional loom hours added to your present producing capacity.

We are Southern Distributors for the SHAMBOW SHUTTLE CO., of Woonsocket, R. I., and maintain in Atlanta a complete Service and Advisory Department, in charge of Mr. A. W. Angell, a direct Factory Representative, whose entire time is at the disposal of the Southern Textile Mills, to help reduce your Shuttle troubles to a minimum. Let us explain to you the advantages of using Shambow Fibre Re-inforced Shuttles and Picker Sticks.

The WALRAVEN *Co.*

Machinery and Mill Supplies. ATLANTA, GA.

How the Cherry Cotton Mills, Florence, Ala., are cutting the cost of handling bales of yarn

Get More From Your Plant Investment

Automatic machines and skilled labor are most effective when aided by Mathews Roller Conveyers.

Both are constantly supplied with work and enabled to produce more. There is no waiting for materials—no confusion—no time lost.

This is only one advantage of Mathews Conveyers. Where cars are unloaded, savings begin long before the raw materials undergo the first operation. Routing from one machine to the next adds its share. The savings continue to grow after the product is finished. To packing room, crating department—to warehouse, delivery, trucks or to cars—each time the conveyer is used another distinct saving is made. The combined saving is usually enough to pay for a Mathews installation in a few months.

Our local representative will be glad to show you how Mathews Conveyers will increase your output, and save you from 50% to 70% every time the raw or finished product is handled.

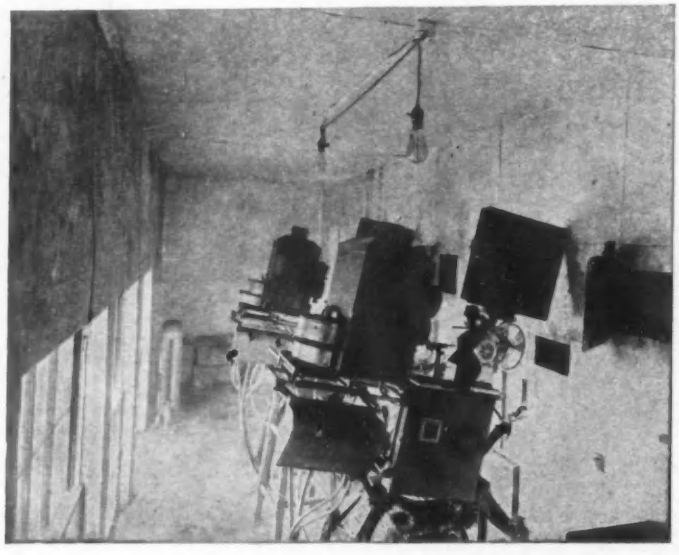
Write today for our booklet showing actual photographs of numerous installations.

MATHEWS GRAVITY CARRIER CO.

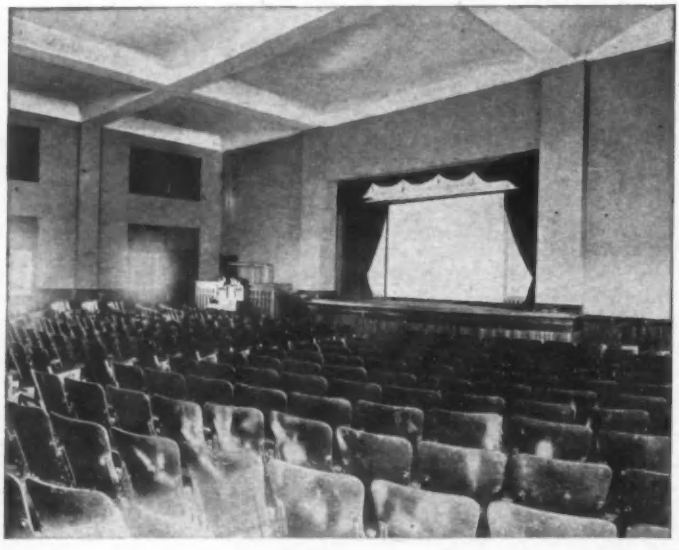
154 Tenth St., Ellwood City, Pa.

Branch Factories: **Port Hope, Ontario, London, England**

Better Motion Pictures For Textile Mill Employees



Showing Installation of Power's 6 B Motion Picture Machines in the Tucupau Mills Theatre.



Showing Interior of Tucupau Mills Theatre, Tucupau, S. C.

THE textile industry is demanding the best moving pictures for their employees, and that is why more

POWER'S PROJECTORS

are used by textile mills in the South than all other projectors combined.

Here Are a Few of the Mills Using Power's

Exposition Cotton Mill	Atlanta, Ga.
Bibb Manufacturing Co.	Columbus, Ga.
Bibb Manufacturing Co.	Porterdale, Ga.
Gainesville Cotton Mill	Gainesville, Ga.
Habersham Mill	Habersham, Ga.
Hillside Cotton Mill	LaGrange, Ga.
Manchester Mill	Manchester, Ga.
Milstead Mill	Conyers, Ga.
Thomaston Cotton Mill	Thomaston, Ga.
Roswell Manufacturing Co.	Roswell, Ga.
Trion Company	Trion, Ga.
Rocky Mount Cotton Mill	Rocky Mount, N. C.
Rodman-Heath Cotton Mill	Waxhaw, N. C.
Pomona Mills	Greensboro, N. C.
Cleveland Mill & Power Co.	Lawndale, N. C.
Spray Cotton & Woolen Mills	Spray, N. C.
Issaquena Mills	Central, S. C.
D. E. Converse Co.	Glendale, S. C.
Monoghan Mills	Greenville, S. C.
Woodside Mills	Greenville, S. C.
Pacolet Manufacturing Co.	Pacolet, S. C.
Tucupau Mills	Tucupau, S. C.
Victor Mills	Greer, S. C.
Victor-Monoghan Mills	Seneca, S. C.
Victor-Monoghan Mills	Walhalla, S. C.
Victor-Monoghan Mills	Jonesville, S. C.
Ware Shoals Manufacturing Co.	Ware Shoals, S. C.
Glenn-Lowry Manufacturing Co.	Whitmire, S. C.
Lanett Mills	Lanett, Ala.
Indian Head Mills	Cordova, Ala.
Selma Manufacturing Co.	Selma, Ala.
Central Mills	Sylacauga, Ala.
Tallahassee Falls Manufacturing	Tallahassee, Ala.

Our experience in Theatre Equipment is at your service

"WE HAVE A SPECIAL OFFER"

Southern Theatre Equipment Company

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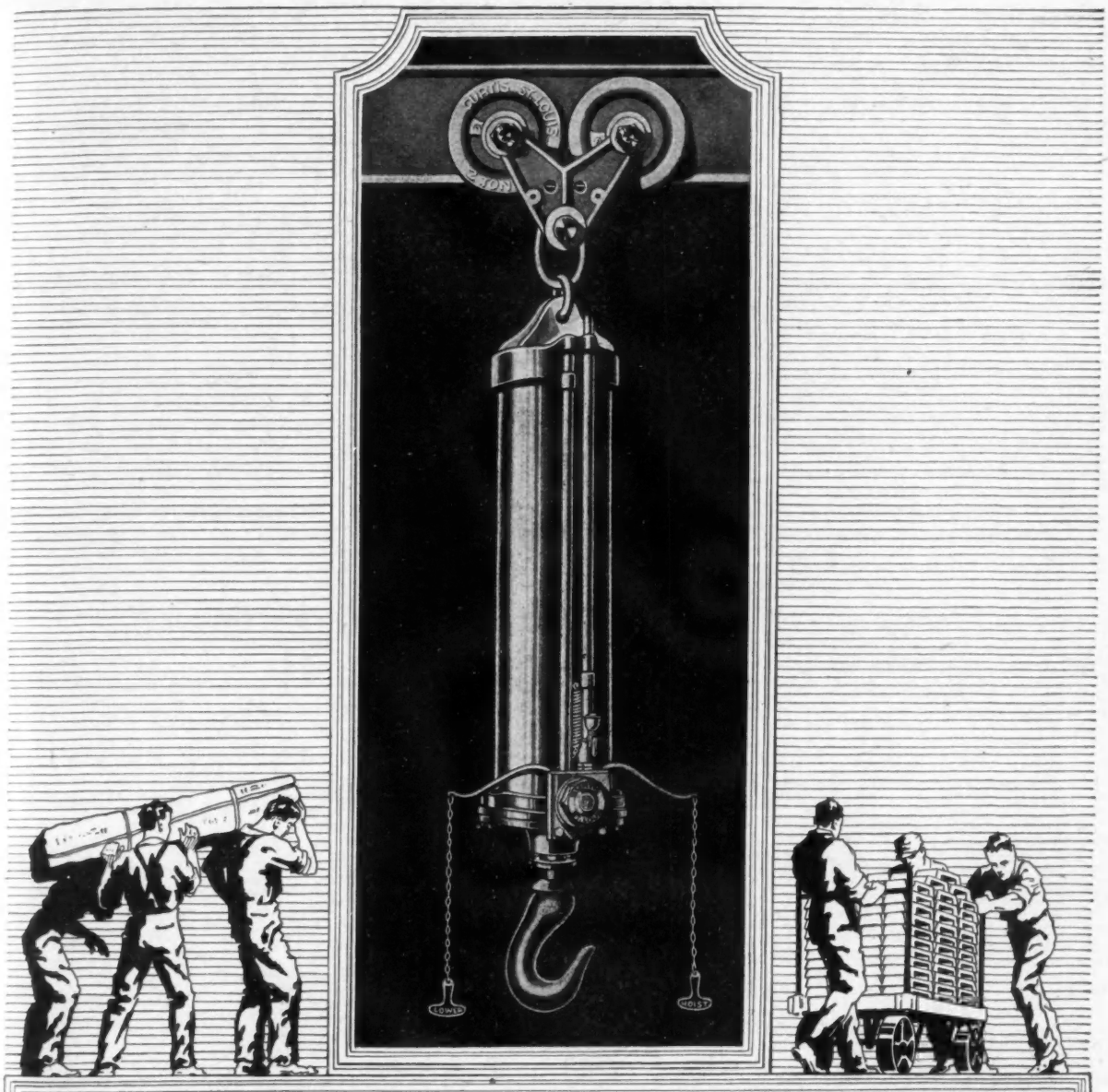

CURTIS AIR HOISTS and TROLLEYS
SAVE MAN-POWER

CURTIS Trolleys are constructed with self-equalizing steel side frames and large inclined wheels fitted with shock-absorbing Hyatt Flexible Roller Bearings—making them easy to start—easy rolling and long lasting.

CURTIS All-Steel Air Hoists, in design and construction, present the perfected results of 25 years of manufacture. They are simple, safe and economical for light and medium loads. Capacities, 800 to 20,000 lbs.

CURTIS PNEUMATIC MACHINERY COMPANY

1571 Kienlen Avenue ST. LOUIS, U. S. A.

Branch Office: 532-R Hudson Terminal, New York City

Banking Value of Mental Capital

Influence of Business Reading

CURRENT authorities on business and economics emphasize strongly the importance of Management in the successful conduct of business. The banker who lends money to an individual or a company, generally is willing to forego something of security in fixed capital if he can count upon a greater degree of skillful management.

Mental capital—the ability and disposition to discharge an obligation—frequently is the best kind of collateral.

As a reader of this publication, it should be a source of satisfaction to know that good Business Papers are admitted to be the most effective single instruments in their respective fields, for the development of mental capital.

Successful managers are invariably close readers of their Business Papers. The editorial pages are richly laden with essential information, ideas and inspiration, while the advertising pages fulfill the function of a great market place of the industry.

The selection of a friend is no more important than the selection of your business reading with its powerful influence for good or bad. Ask our advice if you are uncertain as to the best paper for YOU.

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Motor Age
Motorcycle and Bicycle Illustrated
Motor Truck
Motor World

National Builder
National Petroleum News
Nautical Gazette
Northwest Commercial Bulletin
Northwestern Druggist
Nugent's, The Garment Weekly

Oil News
Oil Trade Journal

Plumber and Steam Fitter
Power
Power Boating
Power Farming Dealer
Power Plant Engineering
Price Current—Grain Reporter
Printers' Ink

Railway Age
Railway Electrical Engineer
Railway Maintenance Engineer
Railway Mechanical Engineer
Railway Signal Engineer
Retail Lumberman
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Shoe Findings
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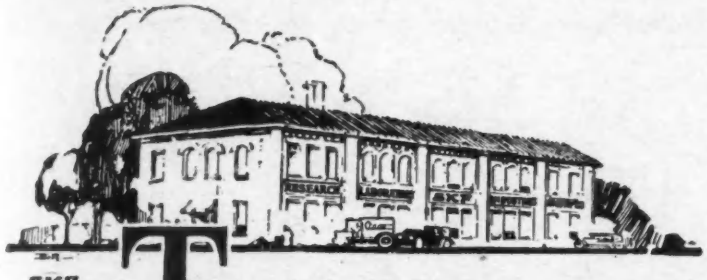

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Research Laboratory established at Philadelphia to co-operate with the Gothenburg Laboratories in the study of the American Manufacturers' friction problems.

THE technical advice brought you by our engineers embodies the experience of highly trained organizations in all parts of the world in the solving of friction problems.

This international experience is both technical and practical and is acquired in co-effort with the best international research endeavor.

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Cable Address, "ONESEED"

MILLS
PETERSBURG, VA.—SUFFOLK, VA.

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PETERSBURG, VA.

Codes Used { ABC—5TH ED. IMPROVED / HOPPE—7TH ED. REV. / ROBINSON—REVISED.

March 26, 1920.

S K F Industries,
165 Broadway,
New York City.

April 23,1920.

Gentlemen:

Attention Chief Engineer

We wish to thank you, and to say that we appreciate highly your sending ******* here to assist us with the trouble we were having with ball bearings in our mill. Mr. *******, we believe, has made us some very valuable suggestions, and we believe, his visit to us is going to prove most profitable. We wish also to thank you for your promptness in forwarding the two 6316 bearings, which came in very promptly.

It is indeed a pleasure to have business relations with a concern that chooses such a policy, as you have shown to us in this instance.

Again thanking you most cordially, we are

Yours very truly,

SOUTHERN OIL & FEED MILLS, INC:

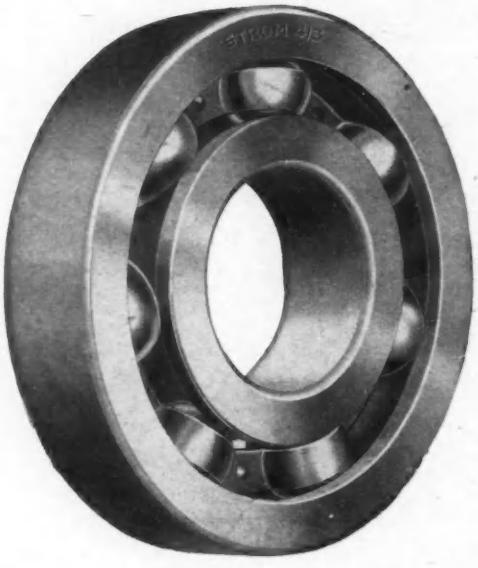
BY:(Signed)

619

SKF

Among these products now offered are:

Single row deep groove ball bearings. Thrust bearings. Steel balls.
Double row self aligning ball bearings. Transmission equipment.



EQUIP YOUR BEATERS AND FANS WITH STROM BEARINGS

Strom bearings with their extra heavy deep-grooved raceways and their extra large balls, are especially suited to withstand the hard service on pickers and waste machines.

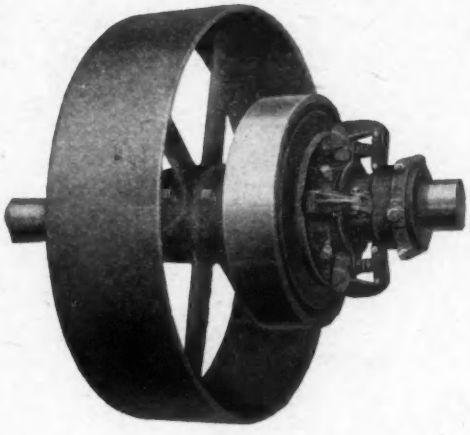
Inferior beater and fan bearings on these machines mean a poor quality of output. Strom bearings with their simple, sturdy construction prevent smudged lap, save oil and power and prevent losses due to shutdowns for repairs.

Complete picker equipment of bearings and boxes to fit any make of picker can be obtained in the Southern territory from the Aldrich Machine Works, Greenwood, S. C.

Radial bearings made in a wide range of sizes for light, medium and heavy duty. Angular contact bearings especially designed to support combinations of radial and heavy end thrust loads. Thrust bearings made in all types and sizes with flat and grooved races.

U. S. Ball Bearing Mfg. Co.
(Conrad Patent Licensee)
4544 Palmer St., Chicago, Illinois.

Strom BEARINGS



Universal Giant Friction Clutch

Friction Clutches are universally recognized as economical and convenient transmission appliances and are installed to secure greater flexibility in transmitting and distributing power to various departments and to individual machines.

Universal Giant Friction Clutches are made with standardized extended sleeves which permit the use of an ordinary pulley of any type.

The clutch is complete—needs no fitting to pulley nor does pulley require any special work to be done so that it can be used on Clutch.

There is nothing to do but to pick Clutch out of stock and ship along with it a standard pulley of size ordered.

Thousands of these Clutches are in use and are giving perfect satisfaction.

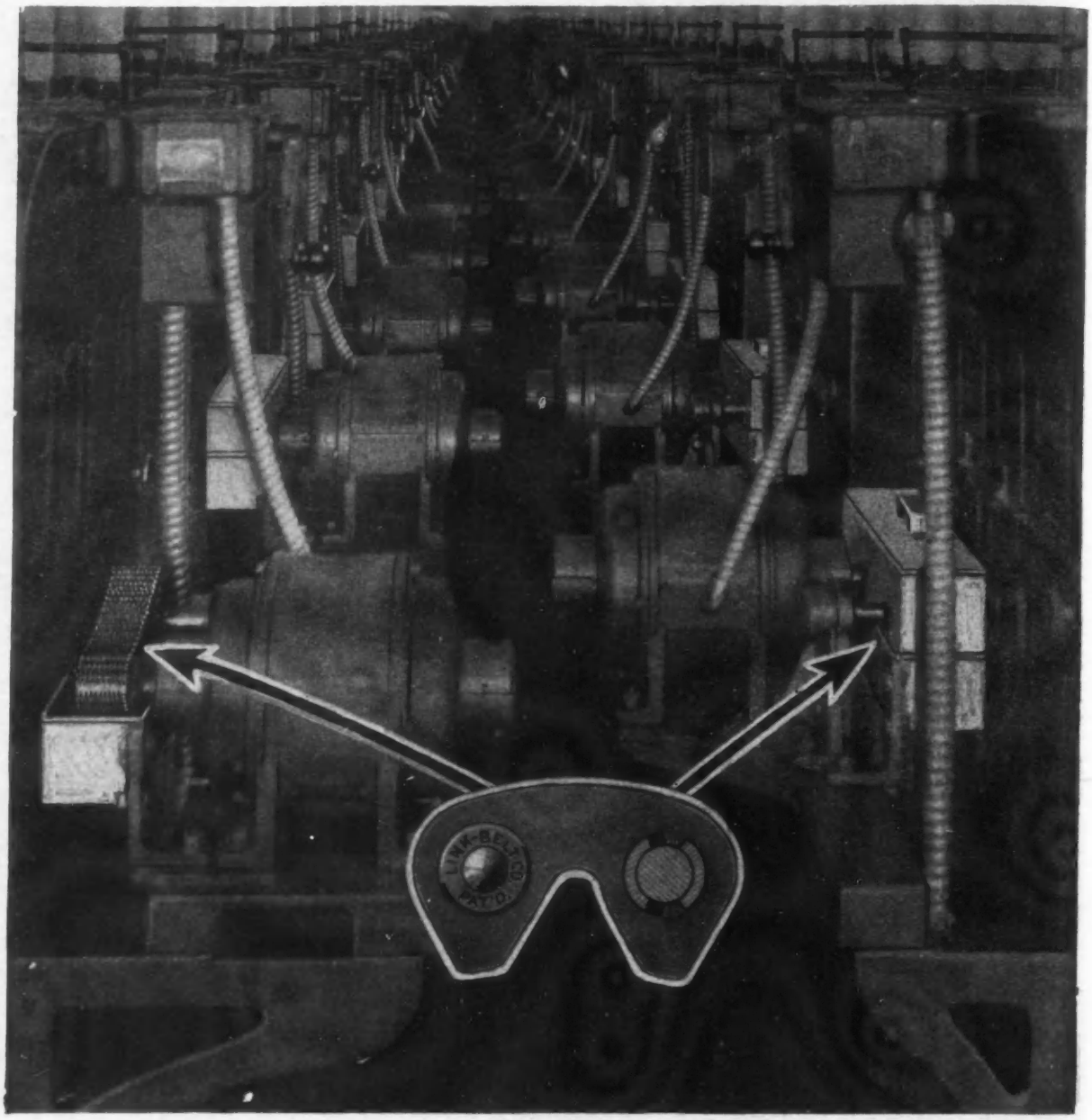
For either a complete installation or a single article of Power Transmission Machinery send us your inquiries.

T. B. Wood's Sons Co., Chambersburg, Pa.

Manufacturers of the largest and most complete line of Power Transmission Appliances exclusively and continuously since 1857

Milton G. Smith, Southern Sales Agent, Greenville, S. C.

Link-Belt Silent Chain Drives



Here is the modern method of driving spinning and twisting frames—individual motors and Link-Belt Silent Chain Drives.

Increased production, flexibility, safety, bettered working conditions, and better finished product, are some of the advantages of Link-Belt Silent Chain, in Textile Work.

It is the ideal drive for transmission from every motor, whether to machine, countershaft, or line shaft. Send for book No. 425 "Link-Belt Silent Chain Drives for Textile Machinery.

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Belt Philosophy

Buying belting is similar to buying an automobile—you should look into it thoroughly to know what you're getting. Therefore, don't order without thorough investigation—know where and how your belting is made—and become familiar with its past performance.

For 78 years *Cocheco Belting* has been the choice of men who know the economy of buying "built-in" belting quality. Every inch of "*Cocheco*" is taken from the center of the butt—a strip that is recognized as the toughest leather obtainable for belting purposes. *Cocheco Belting* is the most economical belting in the long run.

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COCHECO TRADE MARK BELTING

COCHECO BELTING
Quality Belting Since 1842

For maximum power transmission, increased capacity, reduced expenses and long uninterrupted service, *Cocheco Belting* can't be beat.

Investigate today

The Sign of Efficiency — The Sign of Durability

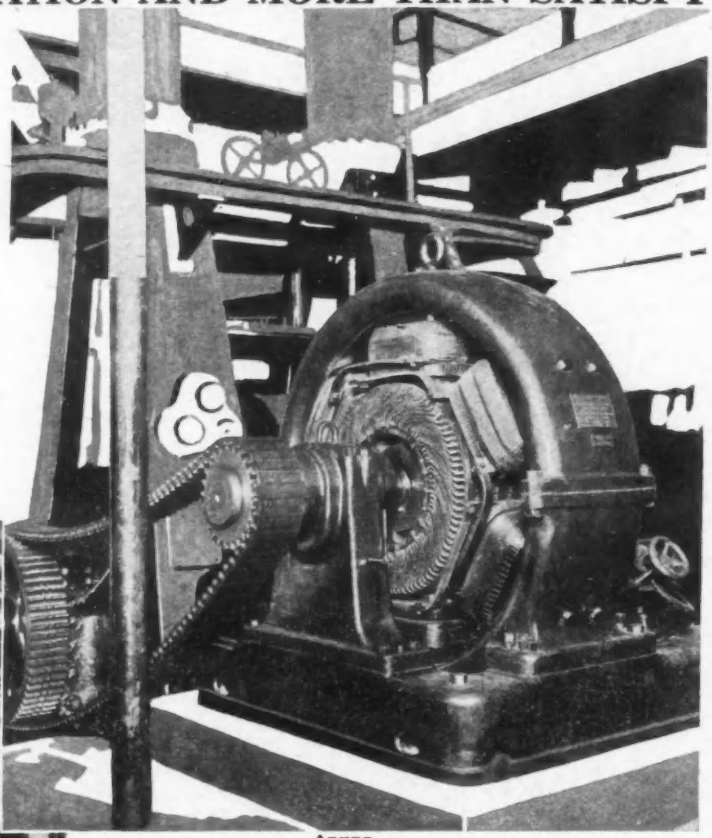
MORSE DRIVES

THE MORSE "ROCKER JOINT"

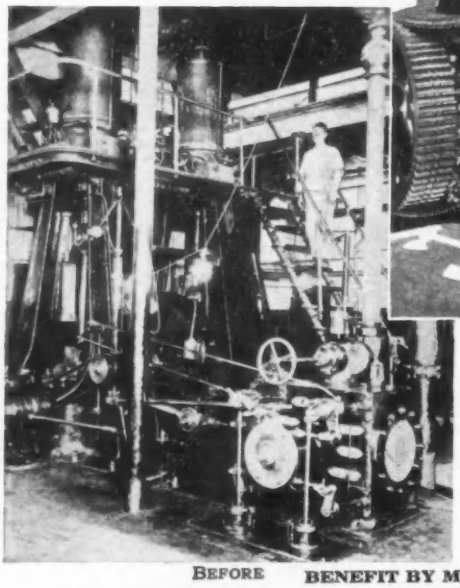
Positive as Gears — Flexible as a Belt — Longer Life

SAVED THE SITUATION AND MORE THAN SATISFY

PRODUCTION and Cost confronted this well known Meat Packing House in Baltimore. They contemplated taking out Corlis Engine driven Ammonia Compressor and installing a new direct connected set. The engineers consulted "MORSE ENGINEERING SERVICE" and thru the use of MORSE Silent Chain Drives, this expense was cut down, floor space saved, efficiency increased, and a still more satisfactory operating compressor maintained.



AFTER



BEFORE

100 H. P. Drive, 106" Centers, 8" Wide, 2" Pitch, 25—69 Teeth, 150—54 R.P.M.

No Slip, 98.6% Efficiency. Oil Baths not Required

Are you looking for improvement in power transmission, the saving of fuel, the saving of floor space by short centers, fixed speed ratios, improved quality, increased production, lower maintenance cost, longer life and dependability, the increase of profits now lost through slipping belts? Investigate MORSE Silent Chain Drives. Let MORSE Engineers give your conditions their careful research.

BENEFIT BY MORSE SERVICE AS OTHERS DO

Write Today for Booklet

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LARGEST MANUFACTURERS OF SILENT CHAINS IN THE WORLD

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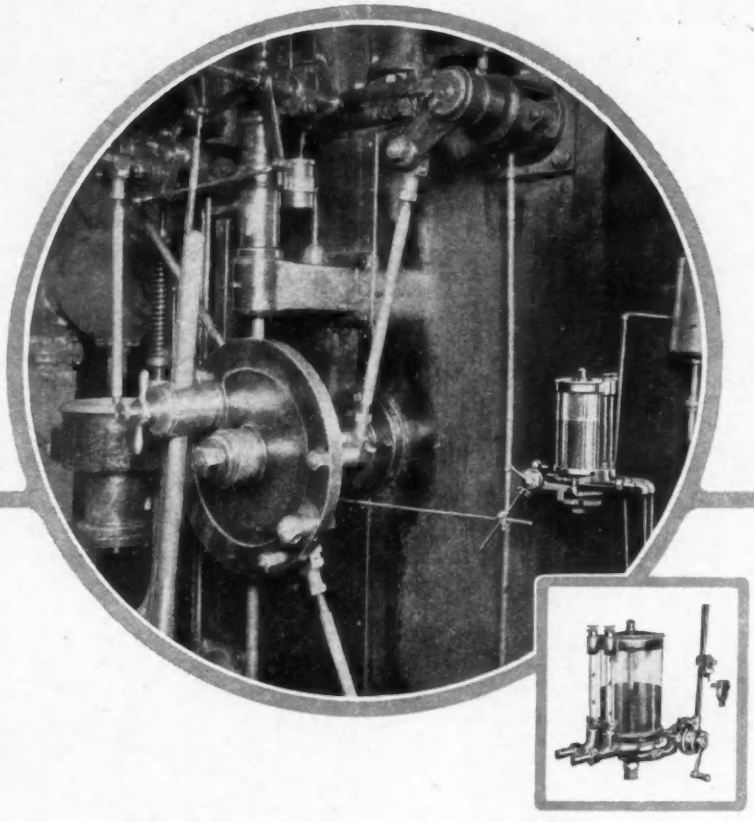
"Morse" is the Guarantee Always Behind the Efficiency, Durability and Service



Hart Oil Pump Installed in Engine Room of Rogers-Brown Iron Company, Buffalo, N. Y.

Out-of-Ordinary Features Distinguish Hart Oil Pump

Where positive, continuous lubrication is demanded, the Hart Oil Pump has been of distinct service to thousands of engineers.

Like other Sherwood Engineering Specialties, the Hart Oil Pump is characterized by out-of-ordinary features in design and construction, which assure dependable economical operation of the engine room.

Tne Hart Oil Pump has demonstrated its worth for more than a quarter century and with the other Sherwood products is distributed through leading jobbers and dealers in all cities.

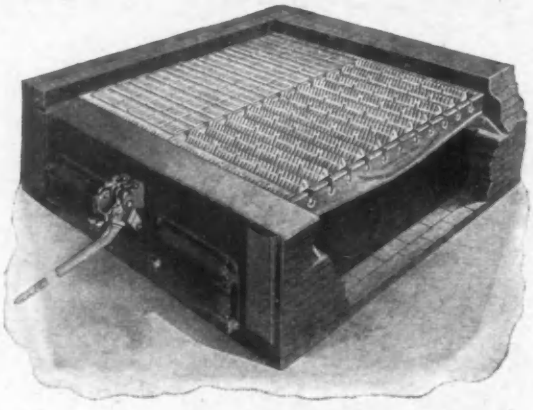
SHERWOOD MANUFACTURING COMPANY
BRASS FOUNDERS AND FINISHERS
Sole Manufacturers of Sherwood Engineering Specialties
BUFFALO, N. Y. (7)

Have you received a copy of the Sherwood Book? It is well worth reading. It describes all Sherwood products including injectors, ejectors, oil pumps, flue cleaners—a complete line of power plant equipment ranging from fusible plugs to grease cups.

Write your name and address on the margin of this page. Forward it to us, and we will send the Sherwood Book to you by return mail.

SHERWOOD
ENGINEERING-SPECIALTIES

PERFECT COMBUSTION WITH LESS FUEL



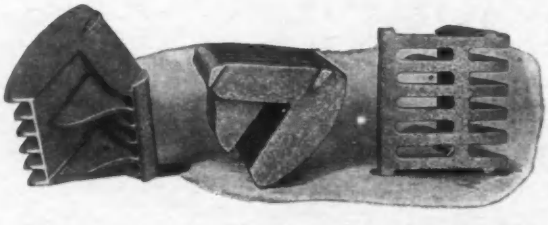
MACDONALD
SHAKING GRATE

is a perfect grate that will help you to lower costs in your boiler room and produce a free steaming boiler.

There are several reasons for the superiority of the MACDONALD Shaking Grate—

1—Unrestricted air passages. 2—Fool-proof locking device. 3—Fuel canot be wasted when grate is being shaken. 4—Powerful leverage for shaking and breaking up clinker. 5—Grates may be repaired or renewed at negligible expense by replacing top sections only. 6—Detachable top sections may be changed to give any desired air opening or spacing of grate. 7—Proper distribution of metal gives the greatest strength possible in proportion to weight of the material. 8—When shaken the maximum irregularity of depth of vibration is given without opening a wide space between sections. 9—A flat grate locked in position so that the surface cannot be left uneven or with points projecting into the fire.

Top sections which make it unnecessary to replace an entire expensive bar when a portion of it wears out. Maintenance expense is therefore cut to the bone.



Let us tell you more about this perfect coal-saving grate, and how it will save you money.

INTERNATIONAL ENGINEERING WORKS, Inc.
FRAMINGHAM, MASS.

Southern Representative,
Isaac Hardeman, Charlotte, N. C.

BOSTON
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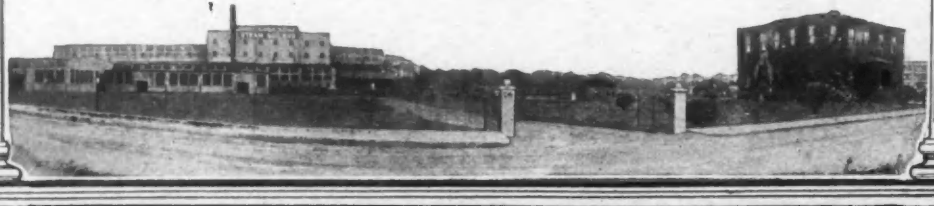
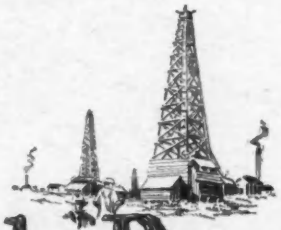
SAN FRANCISCO





Crude Resources

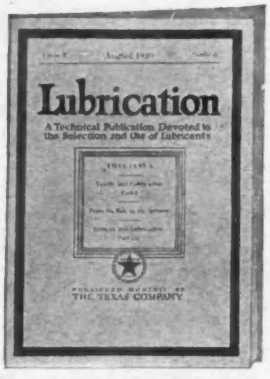
It is generally known that there are certain differences between crude oils coming from different oil fields. For the most part, these differences do not affect the kind or quality of lubricating oils which can be manufactured from the crude, but there are some slight differences which must be taken into account for certain classes of work.

On this account, The Texas Company is exceptionally fortunate in that their producing fields are so widespread.

We secure our crudes from a number of oil fields distributed in various States, and thus, when we manufacture a Texaco Lubricant for a special purpose, we can select the crude best adapted from the variety at our disposal, for securing the particular lubricating results desired.

Our large production and our extensive storage enables us to keep on supplying the right oil for the right place, at all times.

There is a Texaco Lubricant for Every Purpose.



In this magazine we print month after month, articles covering the problems of lubrication as applied to various industries. These articles are not theoretical but based on practical operating experience.

It will be sent free to Engineers, Executives, Purchasing Agents, and all others interested in the use, selection, or purchase of lubricants for any purpose whatever.

get* "Lubrication" *free

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NEW YORK HOUSTON CHICAGO

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Kindly put my name on your free mailing list for "LUBRICATION."

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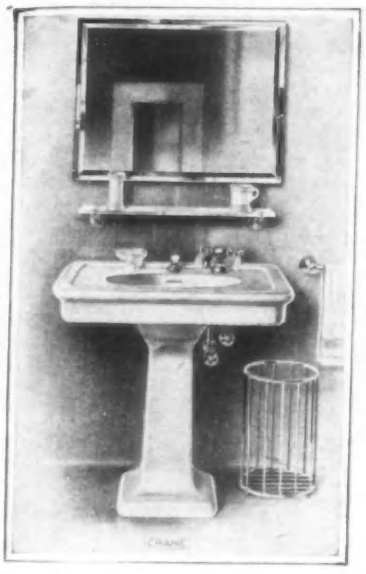

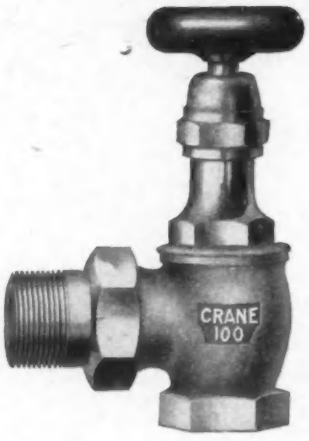

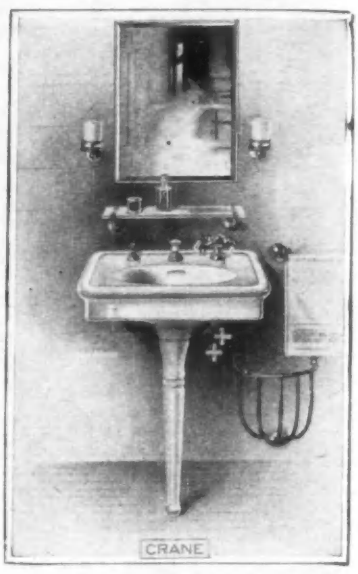

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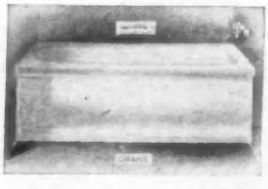
Heating and Plumbing Equipment

represents a product of superior quality in sizes and designs for every purpose, weight and thickness for every pressure, and sixty-two centers of distribution throughout the country which facilitate the selection of reliable material for the small or large building with equal assurance of permanent satisfaction.



SALES OFFICES, WAREHOUSES AND SHOWROOMS:

BOSTON, SPRINGFIELD, HARTFORD, BRIDGEPORT, ROCHESTER, NEW YORK, HARLEM, BROOKLYN, ALBANY, PHILADELPHIA, READING, ATLANTIC CITY, NEWARK, CAMDEN, BALTIMORE, WASHINGTON, SYRACUSE, BUFFALO, SAVANNAH, ATLANTA, KNOXVILLE, BIRMINGHAM, MOBILE, MEMPHIS, LITTLE ROCK, MUSKOGEE, TULSA, OKLAHOMA CITY, WICHITA, ST. LOUIS, KANSAS CITY, TERRE HAUTE, CINCINNATI, INDIANAPOLIS, DETROIT, CHICAGO, ROCKFORD, OSHKOSH, GRAND RAPIDS, DAVENPORT, DES MOINES, OMAHA, SIOUX CITY, ST. PAUL, MINNEAPOLIS, WINONA, DULUTH, FARGO, WATERTOWN, ABERDEEN, GREAT FALLS, BILLINGS, SPOKANE, SEATTLE, TACOMA, PORTLAND, POCATELLO, SALT LAKE CITY, OGDEN, SACRAMENTO, OAKLAND, SAN FRANCISCO, LOS ANGELES

FOUNDED BY R. T. CRANE, 1855

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WORKS: CHICAGO AND BRIDGEPORT

CRANE LIMITED — MONTREAL, TORONTO, VANCOUVER, WINNIPEG, LONDON, ENG., SYDNEY, N. S. W., QUEBEC, HALIFAX, OTTAWA, REGINA, CALGARY.

We are manufacturers of about 20,000 articles, including valves, pipe fittings and steam specialties, made of brass, iron, ferrosteel cast steel and forged steel, in all sizes, for all pressures and all purposes, and are distributors of pipe, heating and plumbing materials

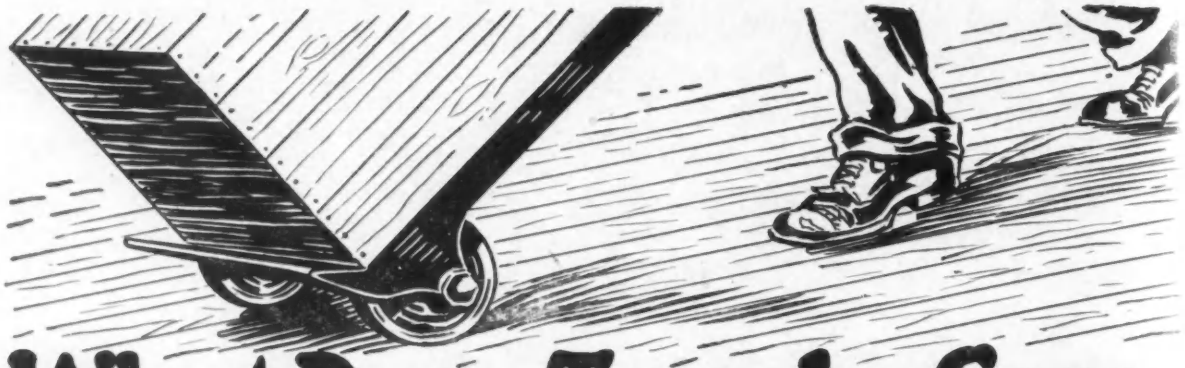
Built by ABERTHAW

SPECIALIZING in industrial construction, working on whatever material proves best suited to meet the requirement disclosed. ABERTHAW offers a building service based on more than a quarter century of carefully analyzed experience.

Built by ABERTHAW invariably means the intelligent adaptation of modern manufacturing practice to the swift, economical and adequate fulfilment of structural enterprises.

ABERTHAW
CONSTRUCTION COMPANY

BOSTON ATLANTA PHILADELPHIA BUFFALO



What Does Tupelo Care

for the hard knocks which heavy loads and heavy shoes impose on a "Tupelo" floor?

"'Nary a care!"

For "Heavy Going"

"a-wheel" or "a-foot," Tupelo floors in Textile Mills, Factories and Warehouses seem to actually grow solider and smoother as they grow older. Nature has supplied

TUPELO, the "Hard-Wear" Lumber

with a closely "knitted" or involved grain, which accounts for its non-slivering, non-splintering and long-wear characteristics.

For *all* the Tupelo facts—please write—*and you can't lay a floor quite* right *until you do.*

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

805 Perdido Building, New Orleans, La., or 805 Heard Nat'l Bank Bldg., Jacksonville, Fla.

Steel Sash Is Cheaper But—

The big reason for using Steel Sash is not its cheapness, though it is often cheaper than wood.

A better reason is its durability. Wood sash deteriorates much faster than a brick or concrete building, and in time must be replaced. Steel Sash, kept properly painted, lasts indefinitely and is always operable.

But the real reason—the **big** reason—for using Steel Sash is that it PERMITS OF MAKING MORE EFFICIENT BUILDINGS.

Steel Sash can be made in bigger units than wood, because its wind resistance is greater. You can fill a continuous opening 12 feet high and 1000 feet long with Lupton Pivoted Factory Sash. Ninety per cent of that entire area will be glass; over half of it may be opened for ventilation. And by using imposts much higher openings may be used.

Wider buildings, more economical to build and to operate, yet far better lighted and ventilated, are possible when Lupton Steel Sash Products are used. Such buildings will be an asset on your books when old-style buildings have been written off and junked.

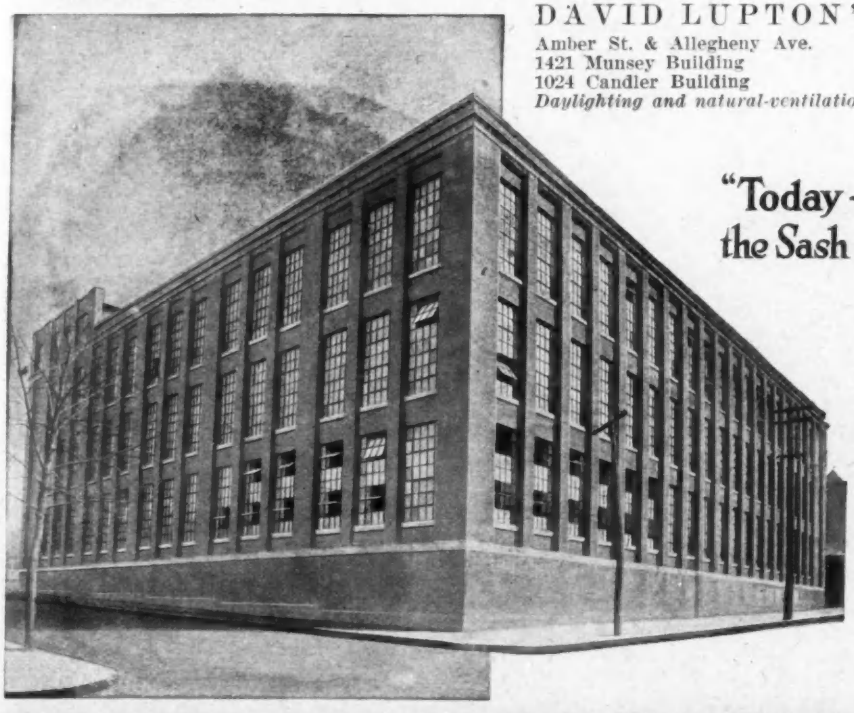
We make several types of Steel Sash for industrial buildings and offices. Our branch offices in Baltimore and Atlanta, and our agents in Jacksonville, New Orleans, Memphis, Greenville and Birmingham will be glad to advise you regarding the most effective application for your contemplated building.

DAVID LUPTON'S SONS COMPANY

Amber St. & Allegheny Ave. Philadelphia
1421 Munsey Building Baltimore
1024 Candler Building Atlanta

Daylighting and natural-ventilation-equipment for maximum production

Reading Cotton Mills, Joseph Bancroft & Sons Co., Reading, Penna.—Lupton pivoted factory sash in side walls. Ventilators individually controlled by spring catch and chain.



"Today —— the Sash makes the Factory"

Lupton
INVESTMENT VALUE
STEEL SASH PRODUCTS

Lupton Pivoted Factory Sash—*Cat. 10-LSS*
Lupton Counterbalanced Sash—*Cat. 10-LCB*
Lupton Steel Partitions and Doors—*Cat.-LSP*
Lupton Rolled Steel Skylight—*Cat. 10--Misc.*
Pond Continuous Sash for Pond Truss roofs, monitors, sawtooths and side walls—*Cat, 10-PCS*
Pond Operating Device for Long lines of sash—*Cat. 10-PCS*

THE FUNCTIONS OF THE ENGINEER

VI—The Place of Work and the Worker's Place to Live

The problem of labor turnover hinges for its solution on contentment of the worker in his work and in his home.

The place *of* work should be inspiring to him as a place *to* work—because of good lighting, good ventilation, adequate sanitation, proper operating equipment of a character that will not break down his morale by discounting his best efforts.

Back of this place of work is the support of the place in which he lives. It should invite his interest in making it a home. Consciously or unconsciously, the worker responds to the creature comforts for himself and his family, to the advantages of good streets, electricity, modern sanitation, the garden patch, the flower bed, to the sense of happiness and security he derives from the knowledge of an increased chance for the health and welfare of his children.

Co-ordinating these various factors which result in better and more contented labor is one of the tasks of the Engineer.

We have prepared a little booklet, "Contentment Under Roof," which describes some phases of industrial community work, its economies and advantages. Send for it, you will be greatly interested in reading it through carefully.

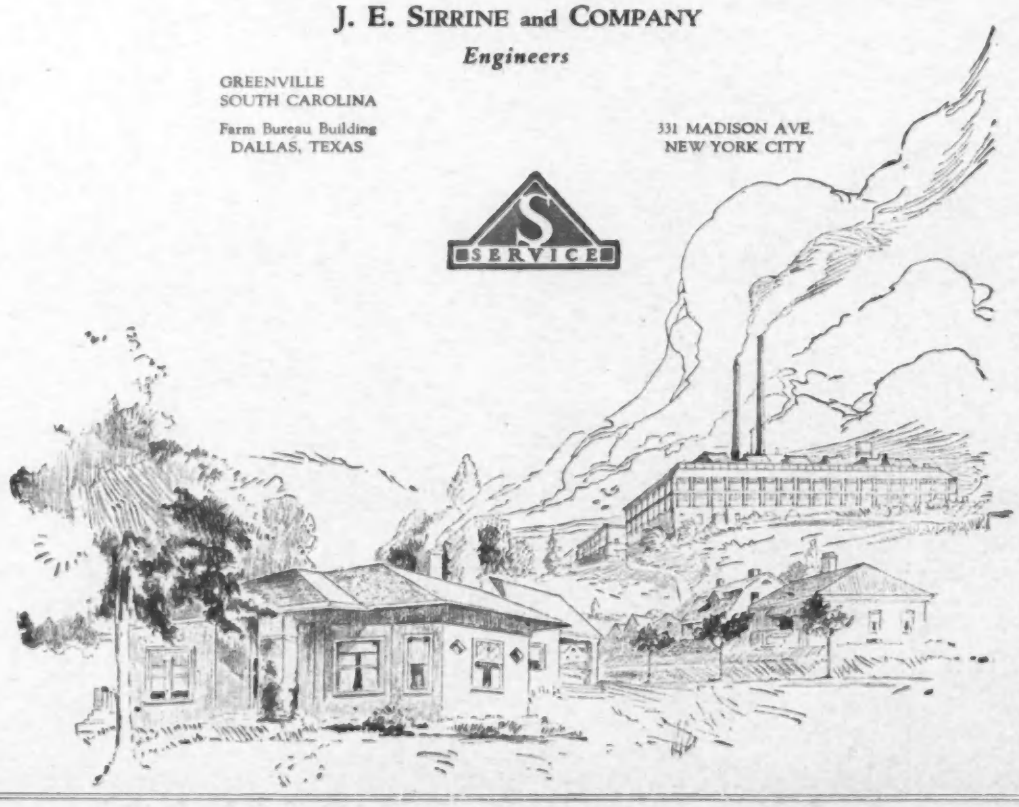
J. E. SIRRINE and COMPANY

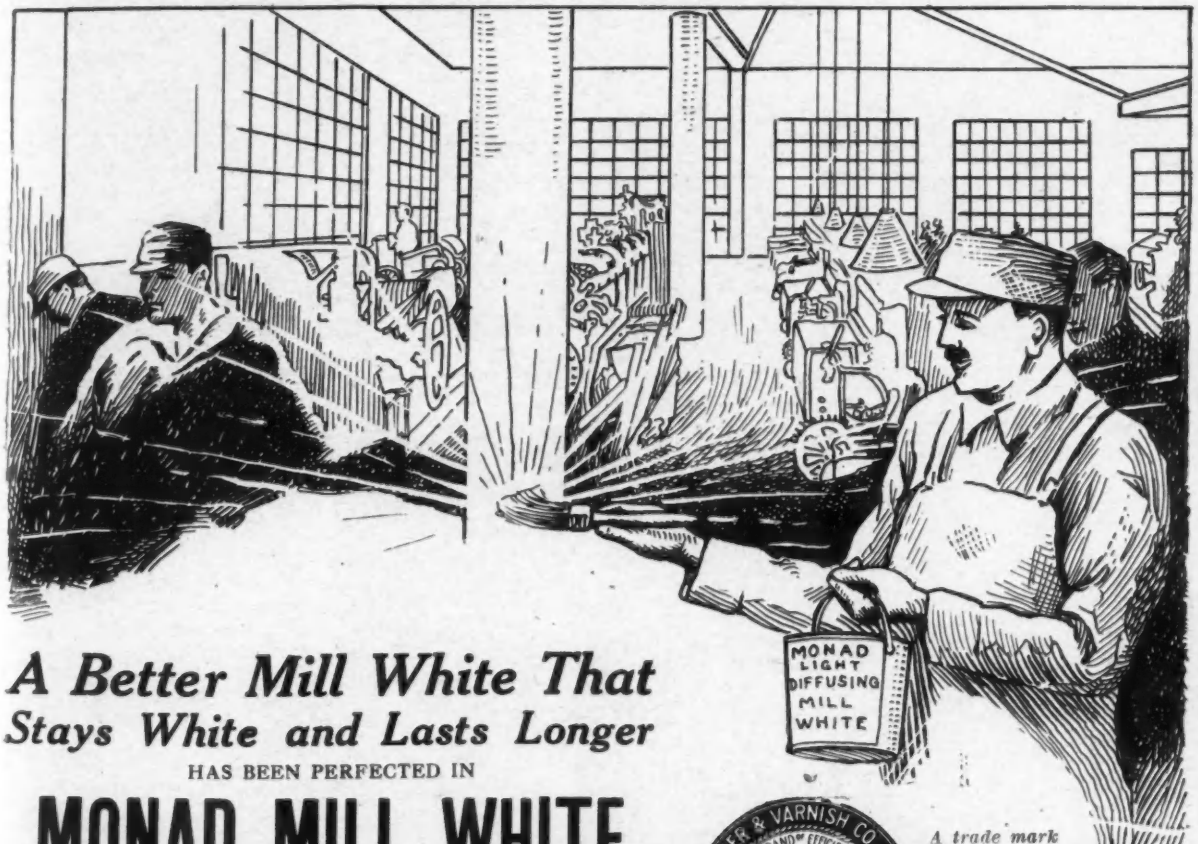
Engineers

GREENVILLE
SOUTH CAROLINA

Farm Bureau Building
DALLAS, TEXAS

331 MADISON AVE.
NEW YORK CITY





A Better Mill White That Stays White and Lasts Longer

HAS BEEN PERFECTED IN

MONAD MILL WHITE

(The Master Wall Finish)

Textile mills find it the most efficient reflecting and light-diffusing coating made . *One coat all that is necessary on previously white painted walls.*

Specify MONAD MILL WHITE if you want to:

—Overcome the waste of dark corners;
—Safeguard the health of your employees;
—Insure the highest human and mechanical efficiency.

MONAD MILL WHITE is Sanitary, Durable, Washable, will not crack, peel, drop or rub off. Specially and successfully designed to

MEET EVERY MILL DEMAND

Made in Pure White High Gloss, Eggshell and Flat Finishes. ALWAYS SPECIFY MONAD MILL WHITE—

SATISFACTION AND ECONOMY GUARANTEED

Full Information Gladly Furnished.

ATLANTIC DRIER & VARNISH CO. PHILADELPHIA
"BRAND OF EFFICIENCY"
MONAD BRAND

A trade mark that is a guarantee of perfect satisfaction when buying paints of any kind.

Other Equally High-Grade Products Especially Recommended for Mill Trade:

MONAD READY MIXED HOUSE AND VILLAGE PAINTS—always reliable as well as economical.

RUBBERITE SPAR VARNISH—The waterproof, weather-proof varnish that won't turn white, scratch, scar or mar. Sold at a reasonable price.

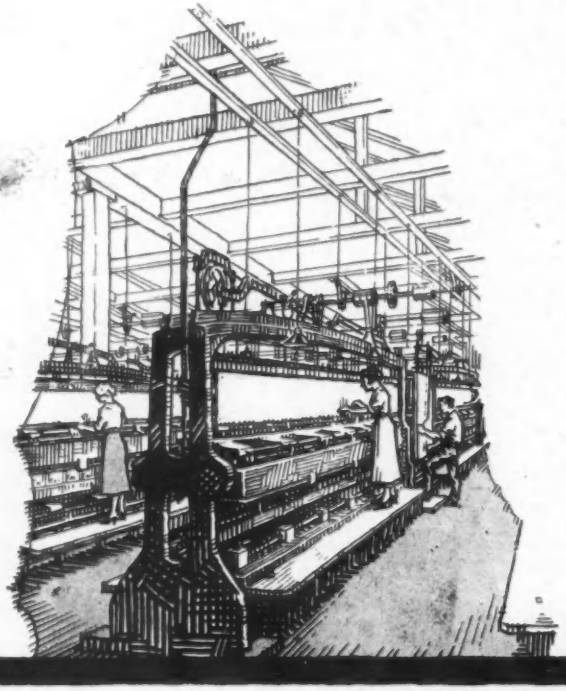
CHISFIN ANTI-CORROSIVE PAINT—Specifically designed for protecting metal surfaces of all kinds under all conditions.

ATLANTIC DRIER & VARNISH CO.

Philadelphia, Pa.

Southern Representative:
R. A. SHERFESEE, 20 Rutledge Ave., Charleston, S. C.

OJACO
MILL·WHITE



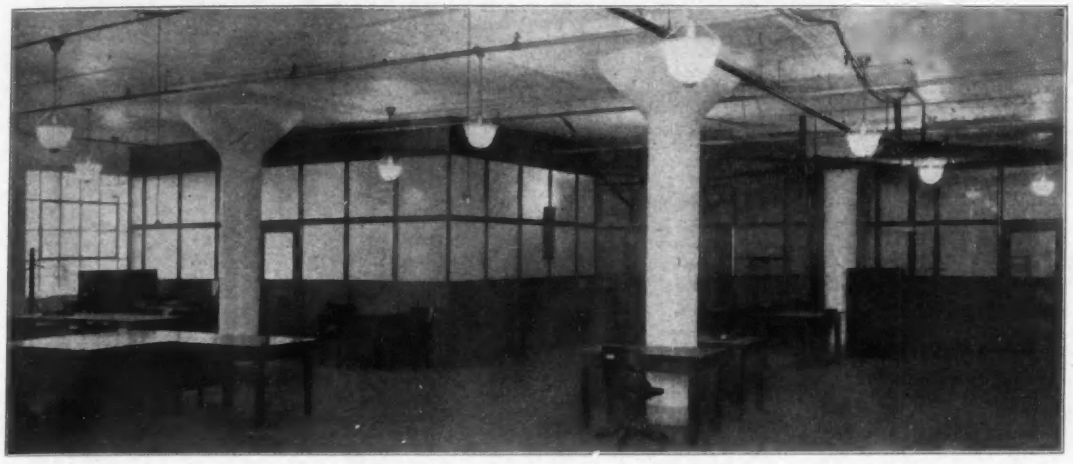
VIGILANTLY the weaver watches the loom as the delicate lace emerges from it—eagle-eyed for imperfections—searching for the tiniest deviation from the pattern.

Skill and experience are a part of the lace weaver's equipment for this work. These—and marvelous machinery—must be further augmented by good light—properly diffused—so that each thread of the lace pattern is illuminated as by a spotlight.

OJACO Mill White on the ceilings and walls of a lace mill will help to increase the efficiency of your plant through its marvelous faculty of making the sun do double duty. Ask us to tell you how it does this.

OLIVER JOHNSON & CO., Inc.
Paint Makers
Providence, Rhode Island

DISTRIBUTORS: Cowles & Bleckley, Atlanta, Ga.; Charlotte Supply Co., Charlotte, N. C.; Lewis E. Tracy Co., Boston, Mass.; F. P. Van Hosen Co., Rochester, N. Y.; M. F. Bragdon Paint Co., Portland, Me.; Dwelle Kaiser Co., Buffalo, N. Y.; American Hard Wall Plaster Co., Utica, N. Y.; B. A. Cook Co., Fitchburg, Mass.; J. B. Farnum Co., Woonsocket, R. I.; Alexander Grant's Sons Co., Syracuse, N. Y.; Wm. F. Harticon, Fall River, Mass.



A typical installation of SANYMETAL partitions, of which a considerable number have been made in the cotton mills of the South.

Sanymetal

TRADE MARK U. S. REG.

Factory and Office Partitions

—really permanent

SANYMETAL eliminates all the loss of material and time in changing partitions about to meet changing needs. This flexibility makes it really permanent.

But SANYMETAL, when set up in place, is as solid and unshakable as any old style partition ever was—without a bolt or screw showing—because it is built in complete unit sections, so nicely designed that they fit together perfectly in any combination you want. They can be changed readily to any new layout.

SANYMETAL Factory and Office Partitions are carefully made of fine metal. They are beautifully finished, both sides being exactly the same, in color and quality to match their surroundings. They are fire-resisting. And they are moderate in cost.

Because of the high standard of materials and workmanship we maintain, we confidently assure you that SANYMETAL will outlast your mill or factory.

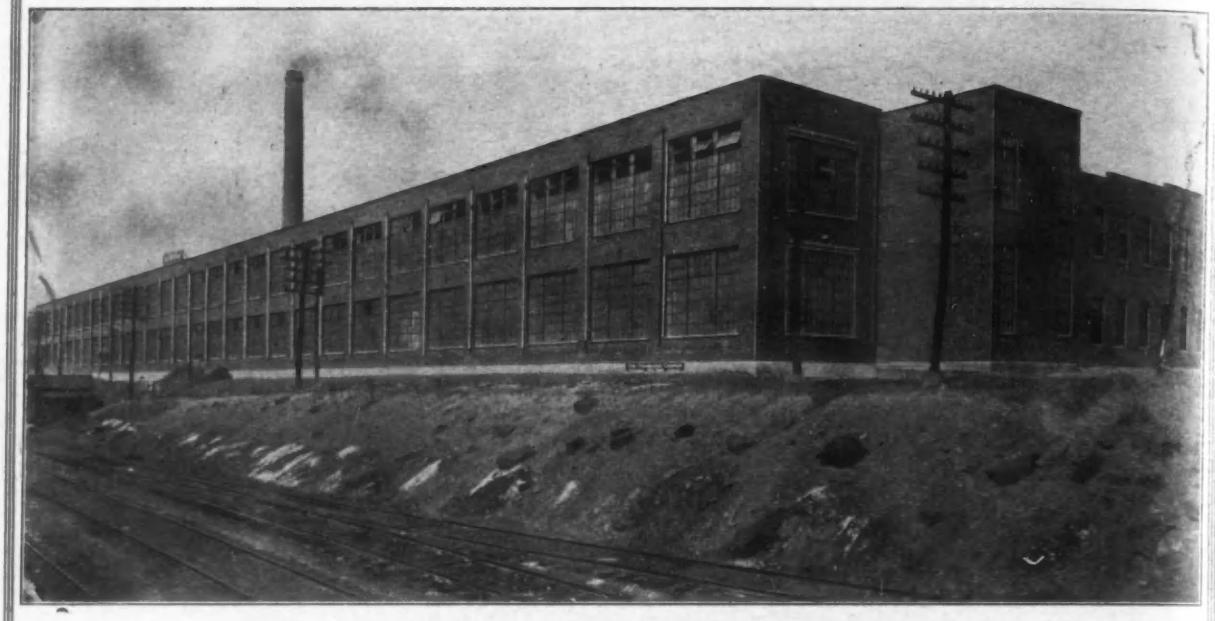
We shall be glad to send you our catalog. Write for it.

THE Sanymetal PRODUCTS COMPANY

TRADE MARK U.S REG.

980 East 64th Street - Cleveland, Ohio

We are manufacturers also of SANYMETAL Toilet Partitions and SANYMETAL Gravity Roller Hinges.



Silk Mill Recently Completed by the Foundation Company.

We have several experienced organizations now available for similar work.

SCOPE

Mills, Warehouses, Industrial Plants, Industrial Buildings, Power Plants, (Steam and Hydro-Electric) Dams, Mine Shafts, Bridges, Railroads, Harbour Works, Caisons, Piling, Etc.

THE FOUNDATION COMPANY

CITY OF NEW YORK

ATLANTA
NEW ORLEANS
CHICAGO
PITTSBURGH
DETROIT

SAN FRANCISCO
SEATTLE
VANCOUVER

MONTREAL, CANADA
PARIS, FRANCE
LIMA, PERU
HAVANA, CUBA
TAMPICO, MEXICO

Von Duprin

Self-Releasing Fire Exit Latches

For Complete Safety

Specify—
Von Duprin
Self - Releasing Fire Exit Latches, as approved by the Underwriters' Laboratories (Inc.) of the National Board of Fire Underwriters:
Report No. S. A. 163; Guide No. 100-F 24.

In building St. Vincent's Home at Drexel Hill, the purpose was to make it the safest possible building for the inmates.

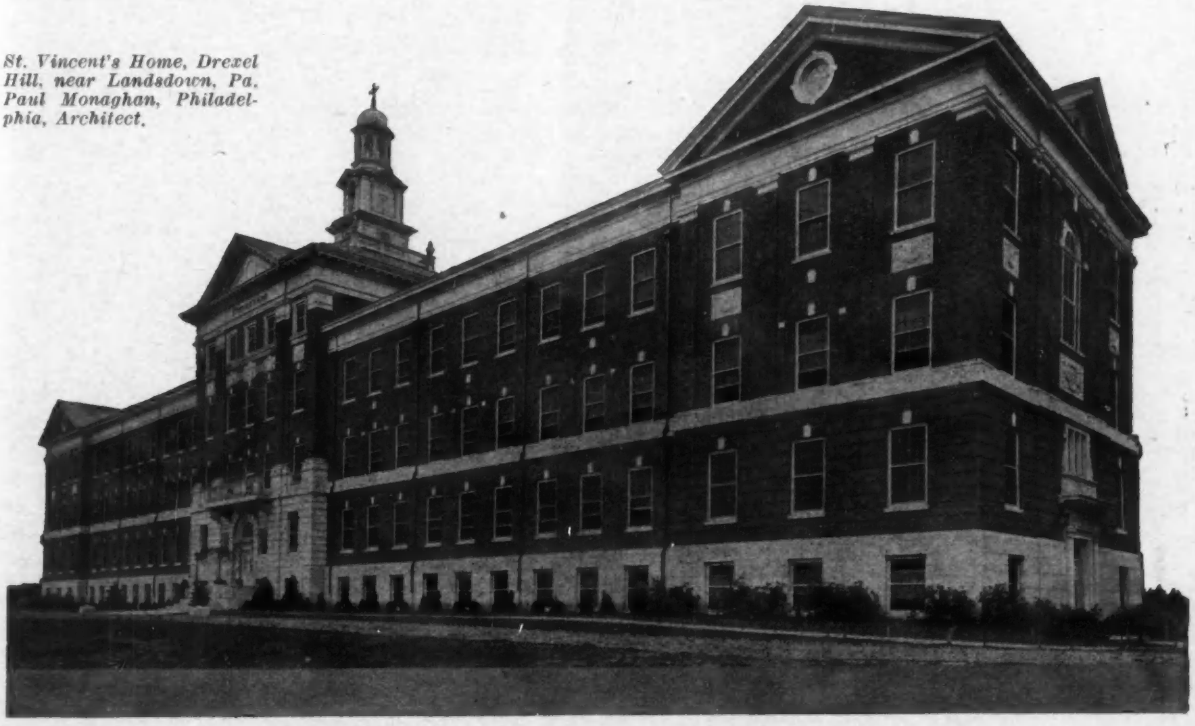
Fireproof construction did not go far enough; Von Duprin latches were added for the protection they give in emergencies.

In a panic Von Duprin latches safeguard the inmates of any building. A touch on the cross bar immediately opens the way to safe exit.

Let us send you Catalog 12-T, and the new booklet, "Saving Lives."

VONNEGUT HARDWARE CO.
Indianapolis, Ind.

St. Vincent's Home, Drexel Hill, near Landsdown, Pa. Paul Monaghan, Philadelphia, Architect.



WindoWalls In Textile Mills

Bibb Mfg. Company
Columbus, Ga.

Robert & Company, Engineers; T. C. Thompson & Bros., Contractors

J. E. Sirrine, Greenville, S. C., Architect

Fiske-Carter Construction Co., Greenville, S. C., Contractors

The Largest Mill in U.S. is Fenestra Equipped

The completion of the new addition to the Bibb Mfg. Co. Mill, Columbus, Ga., gives to the South, not only the largest, but one of the most complete textile units in America.

The fact that the Bibb Company has daylighted and ventilated its new five-story 600 ft. addition with Fenestra WindoWalls, is indicative of the general prestige that Fenestra has among Southern textile concerns.

Leading textile mills throughout the South have installed WindoWalls because of their ventilating and daylighting advantages, and because the WindoWall construction assures much longer service than any other form of window. For example, just in Georgia alone, there are the Eagle-Phoenix Mills, Columbus; Jefferson Cotton Mill, Jefferson; Hogansville Cotton Mill, Atlanta; Peerless Cotton Mill, Thomas; Riverdale Cotton Mills, Riverdale and Rushton Cotton Mills, Griffin—besides many others—all Fenestra equipped.

Sales and engineering offices in Atlanta and Savannah; with nearby Fenestra warehouses conveniently located at Savannah, Birmingham, Ala., and Charlotte, N. C., assure Georgia textile builders of both a quick and thoroughly satisfactory sash installation.

The Model Mill, a recently completed addition to the Textile Industrial Institute, Spartanburg, S. C., embodies the most advanced features of textile mill construction —which, of course, includes Fenestra WindoWalls.

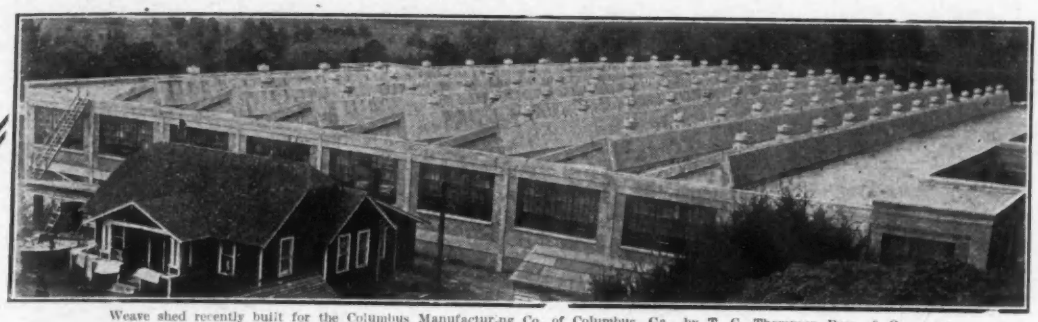
Among the many mills in Georgia alone that are daylighted and ventilated by Fenestra WindoWalls are included:

Summerville Cotton Mill	*Summerville*
Peerless Cotton Mills	*Thomaston*
Adams Cotton Mill	*Macon*
Couch Mills	*East Point*
Eagle-Phoenix Mills	*Columbus*
Georgia Cotton Mill	*Griffin*
Hillside Cotton Mill	*LaGrande*
Bibb Mfg. Co.	*Macon and Columbus*
Hogansville Cotton Mill	*Atlanta*
Jefferson Cotton Mill	*Jefferson*
LaGrange Mills	*LaGrange*
Langdall Cotton Mill	*W. Point*
Riverdale Cotton Mills	*Riverdale*
Rushton Cotton Mill	*Griffin*

Detroit Steel Products Company
4444 East Grand Boulevard, Detroit, Mich.
Canadian Metal Window & Steel Products, Limited, Toronto, Canada

Fenestra
Steel WindoWalls

Sidewall Sash **Continuous Sash** **Counterbalanced Sash**
Underwriter's Labeled Sash **Mechanical Operators**



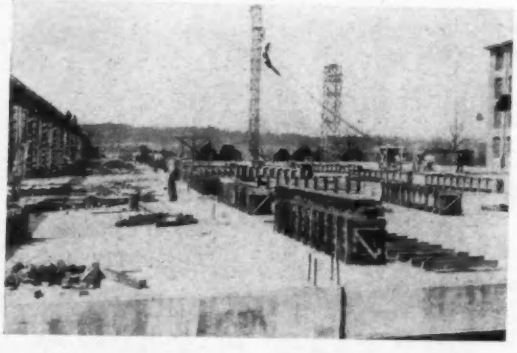
Weave shed recently built for the Columbus Manufacturing Co. of Columbus, Ga., by T. C. Thompson Bros. & Co., contractors in Charlotte, N. C. This weave shed, which has 1,000 automatic looms, is 230 by 340 feet and is an impressive example of modern reinforced slag concrete construction.

Modern Industrial Construction

is reinforced slag concrete construction

"ENSLEY" & "ALA CITY"
BASIC SLAG
CRUSHED & SCREENED

Looking to the welfare of the employees prompted the choice of resilient mastic floors, which were laid by the Interstate Roofing & Foundry Co., Anniston, Ala.



This photo shows construction at the floor. In every detail this weave shed expresses the most modern and efficient ideas in mill construction.

THIS handsome, commodious weave shed of the Columbus Manufacturing Co. is another out-standing tribute to reinforced slag concrete construction.

mastic floors for cleanliness and comfort

The use of mastic floors, shown in the lower photograph, expresses the tendency of the times to seek increased production through the greater comfort (and hence greater efficiency) of employees. The cleanliness, comfort and marked resiliency of mastic floors are proverbial.

—built-up slag roof

The qualities of strength and absolute protection against wear, vermin and fire obtained in reinforced slag concrete were maintained throughout. The built-up slag roof may be expected to measure its sheltering service not by years but by decades.

It was our privilege to supply all of the Basic Slag used in this construction. Prompt shipments from our two plants to all points in the Southeast. May we serve you?

Birmingham Slag Company

Branch Sales Offices:
ATLANTA, GA.
THOMASVILLE, GA.

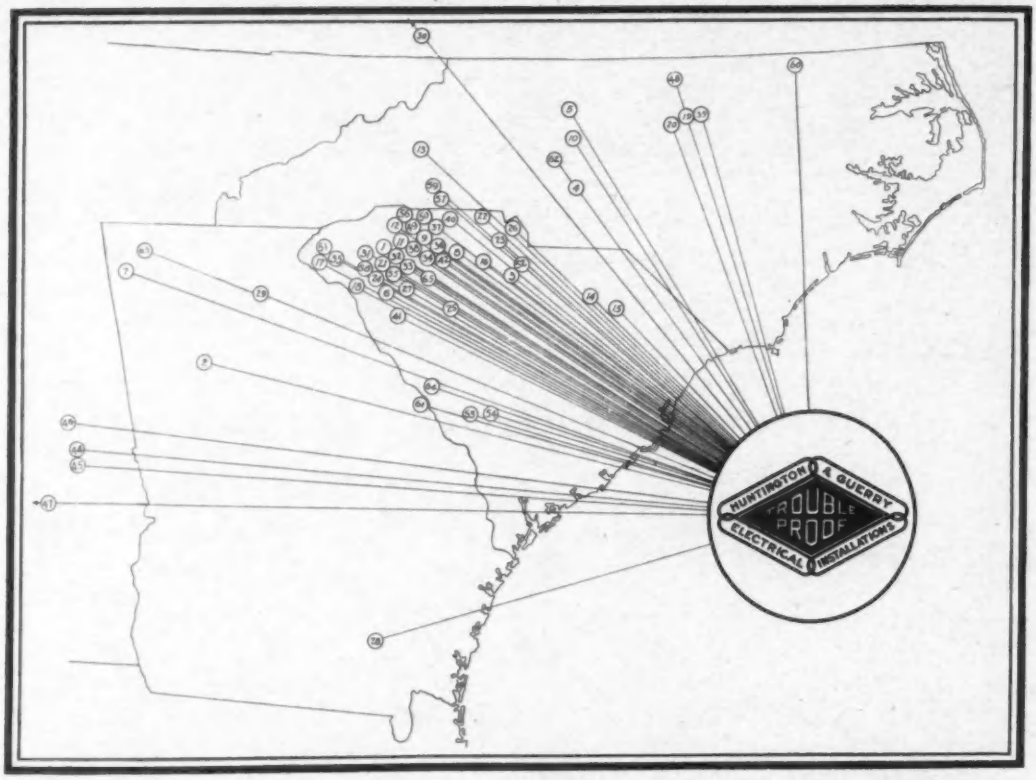
Birmingham, Ala.

Two Plants:
ENSLEY, ALA.
ALABAMA CITY, ALA.

Here are the Owners of the MILLION AND A HALF HAPPY SPINDLES

Driven or Lighted by

HUNTINGTON & GUERRY "TROUBLE PROOF" ELECTRICAL INSTALLATIONS



(1) GREENVILLE, S. C.
1st Southern Textile Exposition
2nd Southern Textile Exposition.
3rd Southern Textile Exposition.
4th Southern Textile Exposition.
Southern Textile Exposition Bldg.
(2 contracts)
American Spinning Co.
(5 contracts)
Dunean Mills
(5 contracts)
Greenville Iron Works
Poinsett Mills
Woodside Cotton Mills
(2 contracts)
Brandon Mills
Camperdown Mills
(3 contracts)
Monaghan Mills
Mills Mfg. Co.
(2 contracts)
City of Greenville (pumping sta.)
Camp Sevier (U. S. Nat. Guard)
Chester M. Goodyear Co.
Couch Mills
Minter Homes Co.
Cyclone Starter & Truck Co.
(2 contracts)
Judson Mills
(3 contracts)
Saluda Mfg. Co.
(2) ATLANTA, GA.
Exposition Cotton Mills
(3) GREAT FALLS, S. C.
Republic Cotton Mill No. 2
(4) ALBEMARLE, N. C.
Wiscassett Mills Co.
(8 contracts)
(5) WINSTON-SALEM, N. C.
P. H. Hanes Knitting Co.
(4 contracts)
Hanes Rubber Co.
(2 contracts)
Hanes Hosiery Mills
(2 contracts)
(6) HONEA PATH, S. C.
Chiquola Mfg. Co.
(2 contracts)
(7) TRION, GA.
The Trion Co.
(2 contracts)
(8) UNION, S. C.
Monarch Mill's
(2 contracts)
(9) SPARTANBURG, S. C.
Beaumont Mfg. Co.
(2 contracts)
Saxon Mills
(2 contracts)
Caldwell & Co.
(2 contracts)
Camp Wadsworth (U. S. Nat. Gd.)
Spartanburg County Mills
Spartan Mills
Model Mill (Text. Ind. Inst.)
(10) LEXINGTON, N. C.
Erlanger Cotton Mills
(4 contracts)
(11) GREER, S. C.
Victor-Monaghan Mills (Greer Plant)
(2 contracts)
Victor-Monaghan Mills (Victor Plant)
(4 contracts)
Franklin Mills
(12 ARLINGTON, S. C.
Victor-Monaghan Mills (Apalache Plant)
(13) MARION, N. C.
Clinchfield Mfg. Co.
(14) DARLINGTON, S. C.
Darlington Mfg. Co.
(4 contracts
(15) HARTSVILLE, S. C.
Southern Novelty Co.
(4 contracts)
(16) CHESTER, S. C.
Baldwin Cotton Mills
(4 contracts)
Springstein Mills
(2 contracts)
Eureka Mills
(17) WESTMINSTER, S. C.
Oconee Mills
(3 contracts)
(18) ANDERSON, S. C.
Riverside Mfg. Co.
(2 contracts)
Orr Cotton Mills
(2 contracts)
Equinox Mills
(3 contracts
Anderson Cotton Mills
(19) DURHAM, N. C.
Golden Belt Mfg. Co.
(3 contracts)
Erwin Cotton Mills
Durham Hosiery Mills Co.
(6 contracts)
(20) CHAPEL HILL, N. C.
Durham Hosiery Mills
University of North Carolina
(21) PIEDMONT, S. C.
Piedmont Mfg. Co.
(4 contracts)
(22) CLOVER, S. C.
Hawthorn Spinning Mills
(23) ROCK HILL, S. C.
Aragon Mills
(2 contracts)
Arcade Cotton Mills
(2 contracts)
Blue Buckle Cotton Mills
(2 contracts)
(24) BELTON, S. C.
Bair Mills
(2 contracts)
(25) NEWBERRY, S. C.
Mollohon Mfg. Co.
(2 contracts)
(26) FORT MILL, S. C.
Fort Mill Mfg. Co.
(5 contracts)
(27) WARE SHOALS, S. C.
Ware Shoals Mfg. Co.
(28) WAYCROSS, GA.
Ware County Light & Power Co
(29) GAINESVILLE, GA.
Gainesville Cotton Mills
(3 contracts)
Pacolet Mfg. Co.
(3 contracts)
(30) MAYSVILLE, KY.
Maysville Cotton Mills
(2 contracts)
Cochran Bros.
(2 contracts)
(31) EASLEY, S. C.
Easley Cotton Mills
(3 contracts)
Alice Mills
(32) SIMPSONVILLE, S. C.
City of Simpsonville
(2 contracts)
Simpsonville Cotton Mills
(3 contracts)
(33) FOUNTAIN INN, S. C.
Fountain Inn Mfg. Co.
(2 contracts)
(34) WOODRUFF, S. C.
Woodruff Cotton Mills
(35) SENECA, S. C.
Victor-Monaghan Mills (Seneca
(36) TROUGH, S. C.
Pacolet Mfg. Co.
(2 contracts)
(37) GLENDALE, S. C.
D. E. Converse Co.
(38) TUCAPAU, S. C.
Tucapau Mills
(39) EAST DURHAM, N. C.
Durham Cotton Mfg. Co.
(2 contracts)
(40) GAFFNEY, S. C.
Gaffney Mfg. Co.
(41) GREENWOOD, S. C.
Grendel Mills
(42) JONESVILLE, S. C.
Victor-Monaghan Mills (Wallace Plant)
(2 contracts)
(43) ENOREE, S. C.
Enoree Mfg. Co.
(3 contracts)
(44) ALEXANDER CITY, ALA.
Alexander City Cotton Mills
(2 contracts)
(45) TALLASSEE, ALA.
Mount Vernon-Woodberry Mills
(2 contracts)
(46) TALLADEGA, ALA.
Samoset Mills
(47) STONEWALL, MISS.
Stonewall Cotton Mills
(48) ROXBORO, N. C.
Longhurst Cotton Mills
Roxboro Cotton Mills
(49) INMAN, S. C.
Inman Mills
(2 contracts)
(50) CHESNEE, S. C.
Chesnee Mills
Glenwood Cotton Mills
(51) WALHALLA, S. C.
Victor-Monaghan Mills (Walhalla Plant)
Keowee Yarn Mills
(52) LANCASTER, S. C.
The Lancaster Cotton Mills
(53) BLACKSVILLE, S. C.
Sunlight Hosiery Mills
(54) BAMBERG, S. C.
Santee Mills
(55) CONESTEE, S. C.
Conestee Mills
(56) FINGERVILLE, S. C.
Cohannett Mills
(57) CAROLEEN, N. C.
Henrietta Mills
(58) PELZER, S. C.
Pelzer Mfg. Co.
(59) SPINDALE, N. C.
The Elmore Co.
(60) ROANOKE RAPIDS, N. C.
Rosemary Mfg. Co.
(61) AUGUSTA, GA.
Sibley Mfg. Co.
(62) SALISBURY, N. C.
Yadkin Finishing Co.
(63) LA FAYETTE, GA.
Consolidated Textile Corp. (Union Div.)
(64) VAUCLUSE, S. C.
Graniteville Mfg. Co.
(65) LAURENS, S. C.
Laurens Cotton Mills

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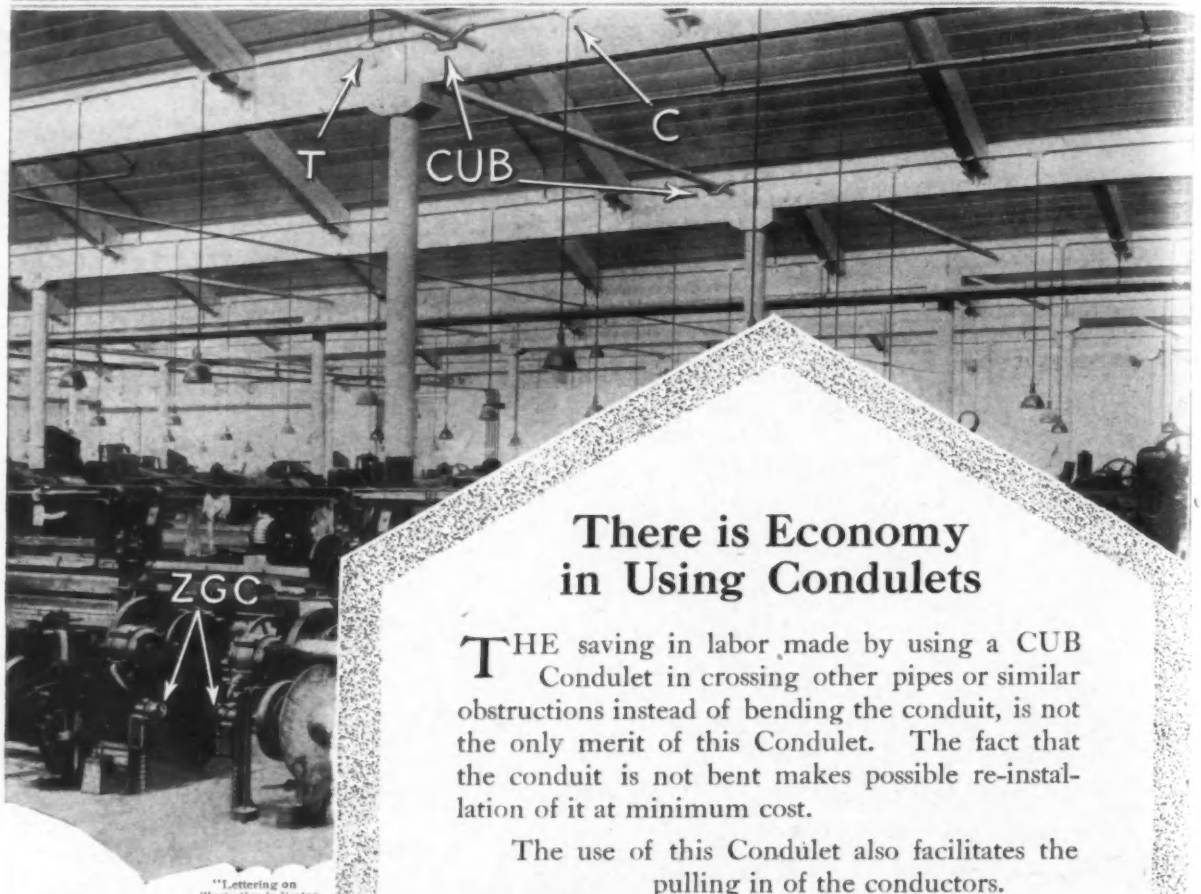
CONDULETS



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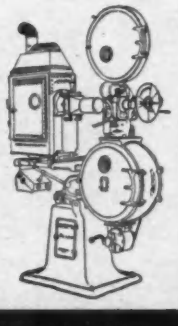

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SOUTH'S LARGEST THEATRE SUPPLY HOUSE

With the Publishers—

The New Textile Products Show.

THE Textile Products Show, which will be inaugurated at Textile Hall, in Greenville, S. C., next fall, bids fair to become a worthy attraction to alternate with the bi-ennial Southern Textile Exposition, whose building it will share and whose promoters and directors are fostering the new exposition. It is planned that the first Textile Products Show will be opened on Thursday morning, October 6, with six days of exposition, the Show being brought to a close on Wednesday evening, October 12.

The idea of having this new kind of a show—which, by the way, will be the first of its kind—was conceived by the directors of the Southern Textile Exposition. Capitalizing the idea, and after much investigation in the North and East, as well as with southern manufacturers, a truly different kind of show has been planned—one which will be confined exclusively to textiles and things made from yarn or textiles.

The exhibits it is proposed to have at this Show will be manufactured goods either made directly from raw cotton and silk, or from yarns of these materials, whether woven or knitted. The manufacturers themselves may make the exhibits or their commission agents may be the exhibitors of the products.

Another class of exhibits will be of those things which are not made entirely from the cloth, but manufactured products in which articles made from cotton are utilized, such as automobile tires, tubes, shoes, slippers, etc. The management of the Show have asked one of the largest manufacturers of collars to install at the Show a complete collar making branch of its establishment, including the cutting, sewing and making of the collar complete. It is also hoped to have manufacturers install in the building operating exhibits manufacturing embroidery, hemstitching, weaving ribbon, and making all kinds of knit goods. It is planned also that the commission houses show every variety of cotton cloth from canvas to the finest dress materials.

Another interesting branch of the Show will be composed of the things which are made from yarn or cloth, not having the appearance of either. These exhibits will include displays of writing paper made from macerated cloth and yarn, ivory pyralin and other products made from linters, etc.

The plan of opening the Show on Thursday morning will give the exhibitors a chance to get their displays ready the first three days of the exposition, and rest and renew their strength on the Sunday intervening (on which day the Hall will be closed) and start on the last three days of the Show with fresh vigor and enthusiasm.

The management is making a strong bid for the support of the manufacturers because of the stimulus it is expected this Show will give to the export trade. In addition to those prospective exhibitors already referred to, it is planned to have as exhibitors concerns who make all kinds of containers for packing and shipping, and those who manufacture stencils and other marking devices for export purposes. The management has enlisted the interest and assistance of the Bureau of Foreign and Domestic Commerce, the export committee of the New York commission merchants, the Association of Cotton Textile Merchants and some of the large banks. It is expected that these banks will be of assistance for the reason that they have representatives in foreign importing cities. They will be asked to send to the Show importers, who will be met at the train, and looked after and entertained in a proper manner during their visit to Greenville. This will be the first opportunity for these purchasers to get in direct touch—in one day—with the manufacturer, the commission agent, the man who makes the package for shipment, the man who makes the marking device, and the banker who handles the drafts and documents and all the credit arrangements. In this way it should be possible to iron out many misunderstandings which are now obstacles in the development of foreign trade.

Another group of visitors who will be expected at the Show will be the manufacturers themselves, the commission men and others who are interested in the textile business, and who will certainly take advantage of this opportunity to get what information is obtainable in a gathering of this kind. The executive heads of the cotton mills will be invited to attend the Show, but not alone. They will be urged to bring with them their superintendents and overseers—the men who actually have in hand the manufacture of their products. The attendance of this latter class of men should tend to develop in them a higher appreciation of the craft in which they are engaged. They will, many of them, see the possibilities in the manufacture of cotton as they have never had an opportunity to view before at a display, and the men will get a chance to see what the other fellow is doing.

A third division whom the directors hope to interest are the wholesalers and larger merchants in the district south of Chicago, east of the Mississippi and through the far Southwest. An extensive advertising campaign will be carried on through the medium of the large, widely circulated dry goods papers, headed by the Dry Goods Economist, and it is hoped, through these influences and every medium available, to get a large number of merchants to see the wonderful collection of textile fabrics and products to be shown.

There will be a number of merchants who will be on their way to the North and East on their fall trips about the time of the Show, who should stop over for a day or two to see the Show because they will have the opportunity there of meeting the representatives of all the large dry goods interests. The Show has already been assured of the support of the leading commission men in the Worth Street district of New York City.

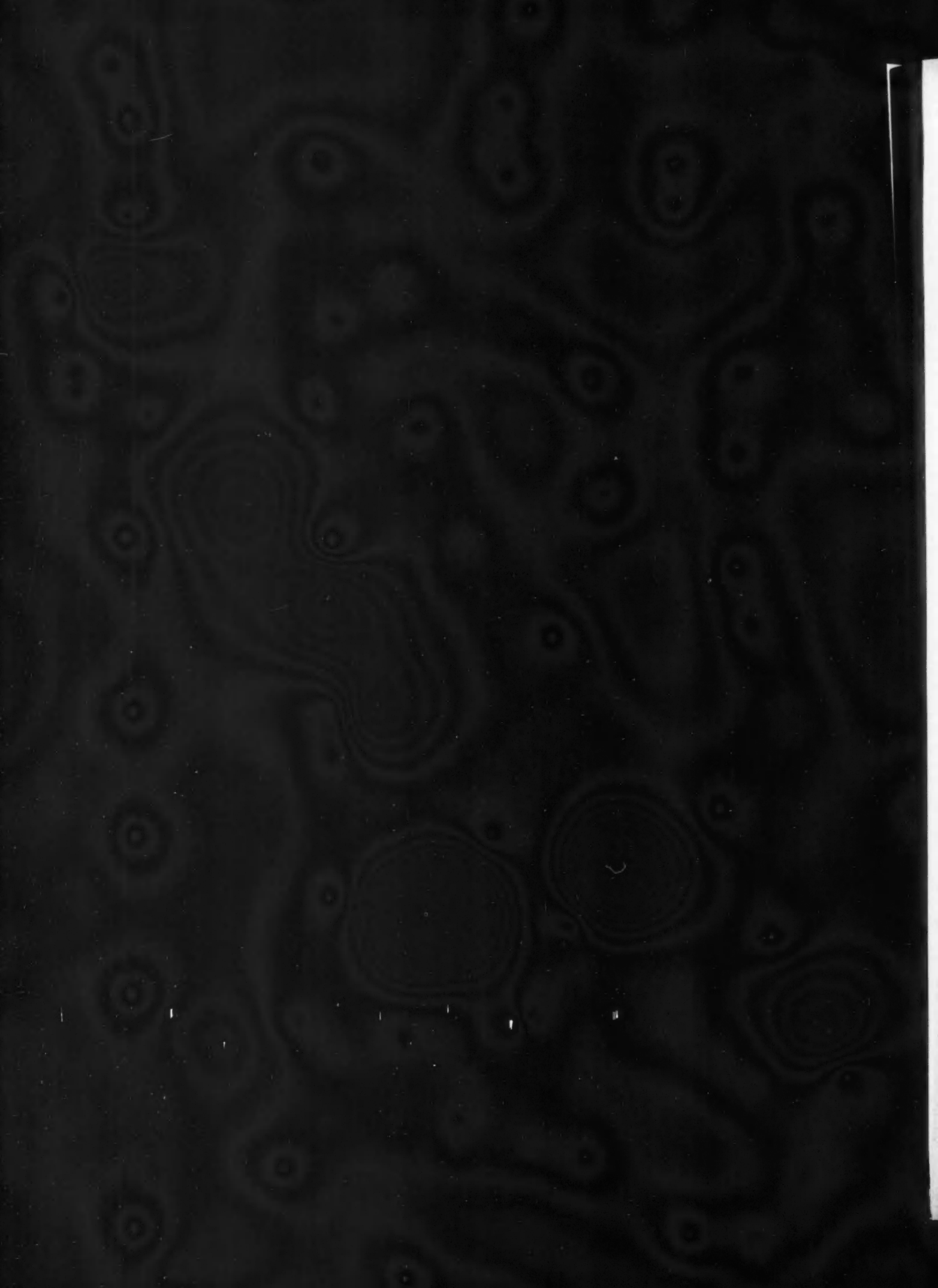
A fourth group of visitors will include the public at large, and whoever else is not included in the groups already mentioned, who will be interested in seeing the Show because it will be, may we repeat, the first great exposition of the products of southern cotton mills and fields.

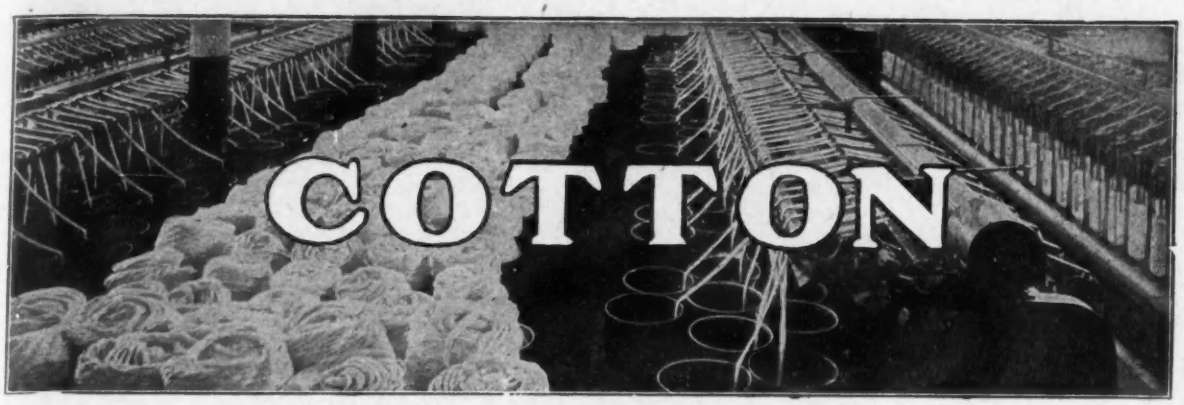
AMONG COTTON'S READERS

Frederick B. Gordon,
President, Columbus Manufacturing Company,
Columbus, Ga.

"As cotton is king of textile fibers, so your publication, COTTON, ranks with textile journals reaching this office."

Frederick B. Gordon





April, Nineteen-Twenty-One

The Wheel Spins.

President Harding is now writing the message which will be the opening gun of the special session of Congress he has called to meet April 11. It is really the new president's first message to Congress, for his inaugural address was read, not to Congress but to the people of the United States. It dealt in interesting generalities and in important promises. The message to Congress may be just as eloquent, but it must deal with specific programs and policies and pave the way for real performances.

The President has found already that this is far from an easy task. The long controversy over the question of giving preference to internal tax reform over tariff revision, favored by the President but opposed by the leaders of the House of Representatives, developed how difficult it is for a new administration to move, even on fundamental questions, without running into vigorous dissenting opinions. It has not been made easier for the President by the fact that essentially he does not desire to take heavy responsibilities, especially when they are outside his domain. If he could have done so, he would greatly have preferred to have the leaders of the two houses of Congress settle the question and abide by their decision. But in the end it is the Harding administration that is at stake, and both the people and the members of Congress look to the President for something more than initiative on a matter of this kind. It has not always been so, but especially since the days of Theodore Roosevelt, the question of legislative initiative has come largely from the White House and somehow the members of Congress—even the leaders thereof—seem greatly to prefer letting President Harding settle troublesome questions for them. He probably will get the blame anyhow if things go wrong, so he might as well start the show.

The demand for both tax and tariff revision came to Washington with vigorous earnestness from the entire country. There was no question that the present tariff law had been made ineffective in every way by the war; that it afforded neither adequate revenue, nor in the eyes of Protectionists, even a semblance of protection to American industries. The same pressure which resulted in obtaining an emergency agricultural tariff measure in the dying days of the Sixty-sixth congress was the prime mover in demanding that the revision of the tariff be made the first duty of the new congress. The fact that President Wilson—almost by his last act—had vetoed the Fordney bill did not lessen this demand. At the same time the industrial elements of the country, particularly those that represented the smaller individuals, were equally clamorous for speedy tariff revision upward.

On the other hand, the large commercial and financial interests wanted taxes attended to first. They pointed out to President Harding that the forthcoming tax reform would, of necessity, have to be retroactive so as to cover the current tax year, and that this would inevitably result in imposing upon current business a tax which could not be ascertained. They insisted that business was entitled to know in advance just what portion of each day's business must be charged up to taxes.

There is no disputing the fact that the Republican leaders in the White House as well as in Congress did not enjoy the seriousness of their task. From the very beginning, it was apparent that the possibilities of satisfying everyone were slight, and that there was an apparent certainty that the number of those who would be disappointed would far exceed the number of the contented. Tariff bills have been proverbially the destroyers of congressional majorities. Except for the Dingley bill, the tariff laws of the last forty years have defeated the parties that passed them. So the fear of 1922 has been written large in all the deliberations of the Washington leaders.

The Democrats of the House and Senate have not been asked to participate in these conferences. When the final bills have been written by the Republican members of the Ways and Means Committee for the House, the Democratic members of that committee will be asked to come in and view their handiwork—but not until then. The Republican majority in that committee is large and safe enough to prevent any Democratic minority from changing the bill, and the latter will have to content themselves with minority reports. In both houses, Republican caucuses are expected to enforce party discipline—but that is just what the Democrats did in passing the Underwood-Simmons law, so there probably will be little complaint from the opposition.

Despite the urgency of both the tax and the tariff questions there is still little basis for a hope that either bill can become a law before September at the earliest. There has been a lot of talk about finishing this legislation in

June or July, but few that know the ropes in Washington take it seriously.

Besides the problems of taxes and tariff, the administration has devoted considerable attention to the extension of our foreign commerce. One of the first acts of Secretary Mellon's regime in the Treasury department was to reappoint Eugene Meyer, Jr., to the War Finance Corporation and direct that body to go to work in accord with the law passed by the Sixty-sixth Congress reviving its activities. Then among the first loans made by the corporation was a loan to make possible the export of several million dollars worth of cotton to Czecho-Slovakia and Germany. Because part of the cotton so exported was consigned to German mills, there were reports that Secretary Mellon had reversed the attitude of Secretary Houston who had disapproved of any policy that would extend such government aid to German credits. It was explained, however, that the real borrowers were two American banks and the fact that part of the cotton went to Germany did not really involve a change in the treasury attitude.

Secretary Hoover, of the Department of Commerce, in his first activities, included the vigorous support of a constructive foreign trade policy. To make it possible that this should be carried out, he has scheduled comprehensive changes in the departmental makeup, and ultimately this will include considerable shifts from the other departments. He pointed out the urgency of such changes in a statement, in which he declared:

"An outstanding economic trouble is that our farmers and our manufacturers are overloaded with food, raw material, and goods that we cannot market abroad, and at the same time, great masses of people overseas are cold and hungry. These people can only purchase on credit pending their own economic recuperation, and our own recuperation depends greatly upon theirs. We are thus not facing over-production, but a breakdown of credit links between us and the areas of under-consumption. Congress has provided the way for the creation of foreign credits by banking cooperation under the Edge act and the logical and economic thing in the whole national interest is for our bankers to work something out. Foreign credits are better than rotten food."

The Treasury department, however, has found no way of stimulating this banking activity, except in the revival of the War Finance Corporation.

Secretary Hoover also called attention to some serious menaces to our foreign commerce contained in the paternalistic attitude of many foreign countries toward their industries, and even toward their consuming interests.

"There are some new forces in the world's commerce that must cause us concern," said Secretary Hoover. "There is a tendency in European nations to definitely mobilize the export, and in some cases the import, trades for militant commercial invasion. In some instances this is being done under government direction and organization, and often even with government finance; in others, it is being carried out by government leadership and suggestion. Such formal or informal combinations may render the position of our merchants and exporters precarious indeed. Beyond this, where these controls are instituted over their own imports of cotton, food, and other agricultural products, they seriously dominate the prices of our own farmers, and where they are instituted to secure control of the world's natural resources in minerals, oils, etc., they may dominate our future supply of these vital raw materials. Our competitors are within their rights in these matters, but we must protect ourselves. Our commercial community has the right in law and has been encouraged by Congress to combine for business outside our frontiers, precisely for the purpose of meeting such contingencies as this. But it all requires that our trades cooperate in an enlightends sense of national service as well as of immediate interest."

When the new reorganization of the departments has been completed, it is likely that Secretary Hoover will take the initiative in pushing efforts of this kind.

The Sanctity of Contracts.

"Since the war business morals in the United States have been shot to pieces." So states a writer in a recent number of one of our nationally circulated magazines.

This may be true, not only of the United States, but of the world. However, it is the morals of the individual that are at fault and they are merely reflected through his business in a larger and more public way, thus attracting more attention. Honesty and fairness is right, in business or out of it, and when a firm or corporation seems to be affected with "cancelitis," it can always be traced back to the "power behind the throne"—to the individual whose personal policies are passed on to his subordinates with instructions to act.

That there has been an enormous increase in "lax methods," to use a soft sounding term, is undoubtedly true. This increase has caused the formation of a National Bureau of Commercial Contracts; it has caused the National Association of Purchasing Agents to undertake a campaign for standardized contracts; it has caused the introduction of a bill before the North Carolina General Assembly to prevent the abrogation of contracts by public service corporations; and it has been the moving force behind innumerable suits at law—all because the moral fiber of the policy directing individual was too weak to stand the strain.

It is useless to talk of "business morals." This is an abstract term like the "corporate soul." It is better to get introspective and when in doubt use the Golden Rule as the perfect moral law. Personal honor will not permit a man to do other than keep his pledged word whether it means financial gain or financial loss, and the honest and continually successful head of a corporation injects his personal honor into every act of that corporation. He avoids broken agreements, unkept promises and sharp practices as he would avoid thievery. He places character and good repute above profits. And he never asks a subordinate to do anything in the name of the corporation that he, as its controlling mind, would not do over his own signature or in his private life.

Business men who depart from this standard of individual morality and seek to slip on the cloak of corporate ambiguity when they enter the office will, in due time, find their punishment in a dubious reputation that will withhold from them the confidence of honest associates and bar them from the field of honest endeavor.

The True Meaning of Valuation Terms

BY CHARLES W. McKAY,

President, McKay and Sherman, Valuation Engineers.

Valuation Terms. This phrase is very suggestive of the dictionary or encyclopedia, and yet it is a known fact that even those who are supposedly well versed in matters pertaining to the evaluation of industrial properties are prone to misuse frequently even the most ordinary valuation terms. Furthermore, those who have a natural bent for the subject of economics, and kindred subjects, will find this phase of the subject of industrial valuation most interesting.

One constantly finds that even such terms as cost and value are misused—or used synonymously. "Cost" may be "value," but "value" is not necessarily "cost".

Generally speaking, valuation terms may be divided into two general classifications, "fundamental terms" and "derivative terms." In order that the correlation of these terms may be apparent, the following table is presented:

Fundamental Terms	Derivative Terms	
Appraisal	Fair Value	Physical Value
Property	Wearing Value	Service Value
Cost	Scrap or Junk Value	Salvage Value for Re-Use
Value	Original Cost	Reproduction Cost
Depreciation	Unit Cost	

Table 1.

The fundamental terms, as shown in Table 1, include appraisal, property, cost, value, and depreciation.

The derivative terms—also shown in Table 1—include fair value, physical value, wearing value, service value, scrap (or junk) value, salvage value (for re-use), original cost, reproduction cost, and unit cost.

The science of industrial appraisement is so new that it may be well to enlarge upon the meaning of the various terms aforementioned.

Appraisal: The Standard dictionary has defined appraisal as "the act of appraising; valuation; especially, the official valuation of an estate, etc."

This term appraisal, or valuation, is also used frequently to denote the completed data—in report form—resulting from the appraisement of an industrial property. Needless to say, the terms "valuation" and "appraisement" are used synonymously.

Property: One of the most important terms used in appraisal work—and one might say in the whole appraisement vocabulary—is "property." It is property upon which the valuation engineer is called upon to place a value, and it is property which depreciates.

A leading authority on the subject of economics has defined property as "The legal right to the possession, use, enjoyment and disposal of a thing." Property as applied to an industrial evaluation consists of two elements. "Physical property" and "non-physical" or "intangible" property.

Cost: The first task confronting the valuation engineer, in undertaking a specific valuation problem, is the determination of "cost."

Professor R. A. Seligman, in his "Principles of Economics," at page 190, defines cost as follows: "The word 'cost' is used in a variety of senses. To the consumer 'cost' means price. If a thing costs a dollar he means that the price is a dollar. To the employer cost means total cash outlay expended in production. Here the cost is usually less than the price, the difference between cost and price being profit; a machine may cost the builder ten dollars. He may sell it for twelve dollars."

In appraisal parlance, obviously, the term cost is only used with respect to the price paid for an article.

As will be shown later, the measure of cost may be determined either upon a "reproduction" basis or upon an "original" basis. In other words, "In appraisal work the cost of an article is the price paid at the time of its original purchase, or the price which would have to be paid to replace it under conditions existent at the time of appraisal, plus such expenditures for labor and incidentals as may be involved in preparing it for actual service."

Value: Again quoting Dr. Seligman: "Value is the Latin term corresponding to the Saxon 'worth.' The fundamental idea which underlies worth is the capacity to satisfy a want."

"As a preliminary definition then, we may say that the value of anything is the exposition of our estimate of its utility, meaning by utility its capacity to satisfy human wants. Value has a meaning only when attached to a definite quantity of an article. The value of iron means nothing; the value of a ton of iron means something."

Depreciation: The Century dictionary defines depreciation as "A fall in value, reduction in worth," and the Standard dictionary as "A lowering in worth."

In discussing the relation of depreciation to valuation Dr. R. H. Whitton says: "Depreciation can be defined as the lessened utility value caused by physical deterioration or lack of adaptation to function."

There are four prime causes of depreciation:

Depreciation resultant from wear and tear.
Depreciation resultant from physical decay.
Depreciation resultant from inadequacy.
Depreciation resultant from obsolescence.

Obviously, depreciation resultant from wear and tear is that arising from ordinary use or service. It is really the most dominant factor in the depreciation of industrial machinery and equipment.

However, even when a machine is not used, a certain amount of depreciation from physical causes takes place. This depreciation may be said to result from age alone. Obviously, it is that caused by rust, corrosion, breaking down of insulated parts of machinery electrically equipped.

These two causes of depreciation are known collectively as "physical depreciation."

Frequently, in the operation of an industrial plant, it so happens that machinery outlives its usefulness—due to the fact that it is of insufficient capacity to serve the purpose for which it was designed. Depreciation due to this cause would be known as "inadequacy depreciation."

"Obsolescence means the depreciation of property through the development of something newer, and either more economical or more of a fad. Like inadequacy it may necessitate the abandonment of property long before it is

worn out, and in many cases arises largely from special causes."

"What is obsolete in one place may not be affected by obsolescence in another."

The two last mentioned causes of depreciation—inadequacy and obsolescence—are known collectively as "functional depreciation."

Derivative Valuation Terms: The fundamental appraisal terms, as we have already seen, are borrowed largely from the kindred subject of economics. As the science of valuation developed many new terms were coined to meet the peculiar requirements of industrial appraisal work. Referring again to Table 1, it will be noted that these terms are, in most cases, derivatives of the fundamental terms. The derivative terms include Fair Value, Wearing Value, Scrap Value, Physical Value, Service Value, Salvage Value, Original Cost, Reproduction Cost and Unit Cost.

Fair Value: Regardless of the basis of appraisement, there is always a "fair" value. This value is also known, in appraisal parlance, as "depreciated" or sound value. What actually constitutes fair value and what elements should be included in its determination has always proved a bone of contention among valuation engineers. Obviously, what may be fair and just in one case may be most unfair in another.

For our present purpose, however, we may define fair value as the present depreciated value at the time of appraisement. To illustrate: A machine may have cost $1,000; it may have an average life of ten years and a negligible junk value. To further our illustration we may also assume that it is five years old at the time of appraisement. Those unversed in the science of valuation may jump at the conclusion that—in view of the fact that the machine has lived half of its (average) useful life—the present fair value is $500, or half of the cost. However, this does not always follow, and it is with respect to such problems as the one under consideration that the need for the services of valuation engineers becomes most apparent.

The machine cited in our illustration may have been well maintained and may be giving excellent service. Therefore it is really the "unexpired" rather than the "expired" life which the valuation engineer should consider. The machine cited in the illustration may, at the time of appraisement, be in so good a condition that it is reasonable to suppose that it will last for at least eight years more. The accrued depreciation is therefore 20 per cent instead of 50 per cent—in other words, the present value, expressed in dollars, may be $800.

Physical Value: Physical property has been defined as that portion of a company's assets which can be actually "seen and felt." The physical value therefore, as the term suggests, is the value of the purely physical property.

Original Cost: Original cost is not hard to define, as the term suggests the actual original cost of a machine, or any other item of equipment under consideration.

In this connection it may be said that the original cost is frequently hard to obtain. Many factors must be reckoned with in the determination of actual or original costs. Fires and other mishaps are frequently responsible for the destruction of books and records of original cost. Furthermore, it frequently happens, especially in the case of the older companies, that the records are not kept in such a manner as to facilitate determination of cost data.

Reproduction Cost: The terms Reproduction Cost, Cost to Replace New, and Replacement Cost, are synonymous. To quote an eminent authority (Mr. Henry Floy): "These terms, so much in evidence nowadays, and recognized by the courts, refer to an assumed value, based on the estimated cost of reproducing the property on the basis of prices current at the time of appraisement—prices that fluctuate considerably are averaged for a period of five or more years preceding the date of appraisement, and is made up so as to include everything that can be inventoried, regardless of original cost, age, service value or present condition as affected by depreciation."

Unit Cost: The physical property of any industrial company is bound to include a large number of homogeneous items. For instance, a company may have a number of looms of exactly the same size and type. Obviously, it would be foolish to list and price out each loom separately. Instead of so doing, where these looms are found in one department, it is customary to assign serial numbers and catalogue the looms in question in somewhat the following manner: Nos. 101 to 110 — 10 20 harness dobby looms at $.... each. In other words, one price is applied to a large quantity. In cases of this kind the price used is only referred to, in appraisal parlance, as a "Unit Cost."

Scrap or Junk Value: Another most important definition from the standpoint of industrial appraisement is that of scrap or junk value. After a machine has lived its useful life there still resides a certain value, the measure of such value being dependent largely upon what the junk dealer will pay for the machine in question. To quote Mr. Floy again: "All physical property has a certain scrap or junk value, a 'barter and sale' minimum basis beyond which there is no depreciation, hence, physical property can only deteriorate until it reaches a scrap value."

Salvage Value for Re-Use: Salvage value for re-use is closely allied to junk or scrap value. In certain cases it may happen that a machine which has lived its useful life, instead of being consigned to the junk heap, may be used in some other department in a minor capacity. In such a case the value would obviously be somewhat higher than the scrap or junk value, the exact measure of value being dependent upon the degree of usefulness of the machine.

Wearing Value: The difference between the cost of property—whether such cost be determined upon a reproduction or original cost basis—and the scrap value is known as the "wearing value." In other words, the wearing value is that portion of the total value of the machine which actually passes out of existence during its useful life. To illustrate: A machine costing $1,000, having a ten year life and a scrap value of $100, will have a wearing value of $900.

Service Value: It is a self evident fact that the various portions of an operating plant have a far greater value when associated one with another than when isolated. In other words, each unit of a plant forms a link in the production chain, and its value is necessarily greater as a part of the chain than as an isolated link. In some cases

it may be necessary to take this fact into consideration in industrial appraisement. In other words, it may be necessary to assign a slightly higher value to an individual machine—due to the fact that it is operating as a part of a going plant—than would otherwise be the case. Such a value would be known as a "service value".

Possibly the foregoing can be made clearer with the aid of a simple illustration. Take the case previously referred to—that of a machine having a cost of $1,000; a negligible scrap value; an average life of ten years, and an age (at the time of appraisement) of five years. Let us, for the sake of illustration, assume that this particular machine is in very poor condition, and that the valuation engineer, under ordinary circumstances, would assign a very low valuation to it, say $200. It may be, however, that a new machine has been ordered to replace the machine in question, and that the machine is merely retained in service until the new machine arrives. Furthermore, it may be that the machine under consideration is giving fairly good service, due to careful operating methods. For certain purposes it would be advisable to assign a value to this machine considerably in excess of the value just cited—$200.

Conclusion: A clear understanding of the terms used in valuation work is, in the writer's opinion, most important, not only to the appraisal engineer but also to operating executives and their lieutenants. Most of these terms are used daily in some form. It simplifies matters greatly if the correct terms are used. To illustrate: A foreman may come to the general manager and say that a certain machine should be "junked." Perhaps this particular machine is in fairly good operating condition, and what the foreman really means is that it should be removed from active service in its present location, and rebuilt, so that it may be used for some other purpose. Naturally, the general manager obtains the impression that if the foreman recommends that the machine should be "junked," it, the machine, is absolutely useless and should be disposed of to the junk dealer.

Is it not far better have a clear and accurate understanding of these simple terms and to use them accurately?

Furthermore, a clear understanding of appraisal terms will be of vast assistance to the reader in his perusal of the subsequent articles in this series.

Can Contracts Be Made Safe?

BY HARRY BOTSFORD.

"Two months ago," a paper salesman told me the other day, "I had over $190,000 worth of orders on my books. Yesterday, the president of the company called me in and told me, that due to cancellations, those same orders have dwindled to $10,000. Isn't that enough to discourage a fellow?"

The salesman was right—it is enough to even discourage the most stout hearted of individuals! As a matter of fact the above situation is too common today and it is one of the most disturbing factors that business has to contend with in this day of getting back to normal conditions. The contractual breakdown is directly allied to the cancellation evil and while business men, as a rule, fume and fret over the deplorable situation, apparently little or nothing aside from a few strictly temporary emergency measures have been adopted or tried out with a view of eliminating the present evil.

The National Association of Purchasing Agents have long realized that a solution to the problem must be found and that such a solution must be arrived at by a calm getting-together of both sides affected by the issue and trying to reach some equitable, practical and inviolate form of contract which will not place any unfair burden on any of the parties concerned.

In their effort to make contracts safe, the association of purchasing agents are cooperating with various trade, manufacturing and professional associations in the United States and Canada in an attempt to arrive at a cooperative contract form which will be possible to standardize. They intend to reach a contract form, which, when universally accepted and established, will result in a crystallization of business opinion toward living up to contractual obligations.

The working plan is simplicity itself. Each of the national commodity committees will work out a contract form meeting with their specific needs. This, in turn, will be presented to particular trade, manufacturing or professional organizations interested. and suggestions and revisions requested on the form. If necessary joint conferences will meet and arrive at mutual agreements.

When the various commodity contracts are worked out, they will be turned over to the Standardization Committee who will then draw up a basic standard form of contract, which will meet the need of every industry, and, in conjunction with the commodity committee, make provisions for each special commodity requirement.

This, briefly, is the definite program worked out by the National Association of Purchasing Agents. It is the organization's wish that every business firm and association will cooperate with them in this matter. It is not the purpose to inaugurate a contract-form that will merely satisfy the buyer but rather a contract-form that is mutually fair in every phase to buyer and seller alike.

The N. A. P. A. have taken the initiative in the solution of this tremendously important problem and in the immense amount of work involved, they must have the confidence and cooperation of the entire business and industrial world. Any suggestion as to the proposed form will be welcomed at the national headquarters of the National Association of Purchasing Agents at 19 Park Place, New York City.

Let us all help to make contracts safe.

The Directory of Textile Merchandise (formerly known as the Directory of Textile Brands and Trademarks), which has just been issued, contains over 15,000 trademarks and brand names of products of which textile fibers, yarns or cloth are the principal materials; this edition lists over 2,000 more brands and trademarks than the previous edition. In addition to the brand name, the character of the product is stated, the name and address of the owner, and the first-hand distributor with method of sale. If the trademark or brand has been registered since 1900 that information is also given. All names are alphabetically listed. In addition, there is a classified list of textile products with all the brands given under each. The publishers of this directory are the Bragdon, Lord & Nagle Co., New York City.

The Application of Ball Bearings to Spinning Frame Cylinders.

BY A. P. ALDRICH, JR. *

Modern engineering practice seems to point to the use of individual motors for spinning frame drives where electric power is available. Many old mills are doing away with their line shafting and belts in favor of the new style drive. The change, however, has in many cases resulted in bearing troubles that are very annoying and sometimes serious. It is the purpose of this brief discussion to explain the causes of these troubles and offer a simple and effective remedy for them.

The change from a belt to an individual chain drive will increase the load on the bearings about three times. This is because the ordinary spinning frame has about a 12 inch driving pulley, and the sprocket used with the chain drive is generally about 4 inches in diameter. The pull on the surface of the pulley or the pitch circle of the sprocket is proportional to the respective diameters of the pulley or sprocket, if a given amount of power is to be transmitted.

If the sprocket is approximately one third the diameter of the pulley, it will require approximately three times the pull on the chain that was required on the belt. Three times the pull means three times the pressure of the shaft on the bearing surfaces and three times the amount of friction loss.

We can assume that the makers of a frame allowed ample margin of safety in designing the bearings and shafts, but it is not likely that many bearings will carry three times the expected load without heating, and it is found in practice that heating is nearly always present when an old frame is changed over to individual drive. The amount of heating may be slight, so that more frequent oiling will relieve it, or it may be so serious that no amount of oiling will keep boxes from wearing out rapidly. More oil, applied oftener is expensive, and causes a great deal of mess on account of oil running on the floor, and flying from moving shafts.

Another feature of the individual drive that aggravates the bearing trouble is the change in direction of the shaft pressure on the bearing surfaces. With belt drives the pull is from above or below the frame, and the shafts are pressed against either the upper or lower half of the split boxes used as main bearings. As these present an uninterrupted bearing surface, the oil film is maintained and correct lubrication is possible. Individual drives change the direction of pull from vertical to horizontal, and thus press the shaft against the split in the box, which breaks the oil film, and scrapes the oil off the shaft and out through the box. This makes it almost impossible to keep oil in the boxes and would give trouble even if there was no increase load to contend with.

Possible remedies for this trouble would be to use larger sprockets so that the conditions would be the same as with belt drive, and to change the location of the motors so that they would drive from above or below like the belts. Neither of these is practicable however, as the cost of larger sprockets and the longer chains required would be considerable, and the high chain speed would not be desirable. Changing the position of the motor is undesirable as it would be in the way and interfere with scouring floors if placed on the floor, and a rather expensive bracket would be needed to put it above the shaft.

Another remedy is to use solid bushings of brass in place of the split boxes. The boxes can be bored out to take these bushings, and as they have a continuous surface the lubrication will be better than in the split bearing. This does not always work well however, as the increased load will wear out these bushings just as it wears out the outrigger boxes which are usually solid anyway.

The best remedy for bearing troubles is to use an entirely different type of bearing that will have ample load carrying capacity and no lubrication troubles. The ball bearing fills these requirements exactly, as a comparatively small ball bearing will carry several times the imposed load, and do it with almost no friction or lubrication. Where ball bearings are used it makes no difference from what direction the load is applied or how great the chain pull. These bearings are mounted in grease-proof boxes that require greasing only once in three or four months, and are perfectly clean and very economical of oil. The oil saving is at least 95 per cent of that required for plain boxes.

Maintenance is nearly absent where ball bearings are used, and in the few cases where bearings may require replacement, no damage is done to either shaft or bearing housing, and all that has to be replaced is the bearing itself, so that replacements can be made quicker and more cheaply than where shafts as well as boxes are injured. Ball bearings properly installed and greased occasionally will last almost indefinitely and without appreciable wear. The friction in a ball bearing is negligible, and a considerable amount of power is saved.

The fact that ball bearings do not wear like plain bearings gives them another advantage on chain and sprocket drives. With the high-efficiency systems now used, it is necessary to keep motors and shafts in correct alignment, so that the teeth on the chains will mesh correctly with those on the sprocket. Unless the shaft is at right angles to the chain, the load will be carried on a small section of each tooth, causing rapid wear on chain and sprocket. A worn outrigger bearing may allow the shaft to get enough out of line to ruin a chain in a short time. Ball bearings may be depended upon to keep permanent and exact alignment so that chains run properly at all times.

The cost of ball bearings is moderate, particularly if put on when the motors are installed, as the additional cost of installation for the bearings does not amount to much if the frames are dismantled to install motors. On very old frames it is frequently necessary to put in new shafts and work over the old bearings at the time of making the change to motor drive. If new shafts are put in, it is much more economical in the long run to install ball bearings than to work over the old boxes. New shafts are somewhat expensive, and ball bearings will insure their lasting indefinitely.

The H. K. Ferguson Company, engineers and builders, have announced the removal of the offices of their Southern Department from 815 Austell Building, to Room 218, Healey Building, Atlanta, Ga. Richard W. Alger is manager in charge of this Southern Department.

*Aldrich Machine Works, Greenwood, S. C.

Reducing the Cotton Acreage

BY JOHN S. BARROWS.

Ever since the estimates of the quantity of cotton coming from the crop of 1920-1921 were made, showing the unusually large returns, with correspondingly lowering prices, much has been uttered in the press and on the platform regarding the need to the cotton-grower of reducing the acreage to be planted this year. The arguments have taken various forms, and too much has been said in an attempt to justify a movement which is not unreasonable, under the circumstances.

Looking at the situation from the outside, it is evident that in order to allow consumption to correspond more closely with production; in order to insure reasonable remuneration for the cotton, and not allow an unnecessary accumulation from year to year, it seems evident that it will not be possible for the cotton crop to be controlled as to its size and extent, so long as present methods of growing, marketing and using it are continued.

In effecting a change from present methods, education must be an important factor if desired results would be obtained. The cotton planters include in their ranks a wide range of intelligence and education at present; as wide as the difference in the size of areas available. It will be impossible to educate a portion of this great army for many years, as important factors have much to do with conditions, so it will be necessary for that portion of the cotton-growing fraternity who do recognize the conditions, and are able to see their individual responsibilities in the matter, to take on themselves the greater sacrifices which will be absolutely necessary if the size and value of the cotton crop is to be what they desire. These planters must bear the greater burden, even out of proportion, of reducing acreage and introducing diversification of agricultural crops. The small farmers, carrying on farms that produce one or a few bales of cotton can not be expected to reduce their acreage a square rod; and instead they may be expected to attempt to increase, in the expectation of gaining from the higher price of the staple. Such conditions must be faced and discounted by the large farmers, who at the same time will be obliged to reduce their acreage one-half, or two-thirds, or perhaps to nothing, in order to establish the new and much desired policy of a better controlled cotton crop.

The recent crop was between 12,000,000 and 13,000,000 bales; and from an acreage of over 30,000,000. The average was perhaps one bale to three acres, and here is the first error in securing a proper crop.

It is already possible in some places to harvest one bale from one acre, but that is due to very advantageous circumstances. If this were generally possible the annual harvest would be over 30,000,000 bales, to meet an annual world's consumption of about 20,000,000 bales. Such a crop would be out of all reason, and an agricultural and financial insanity. It is also understood, that if the available cotton acreage of Texas alone was devoted to the staple, the crop would be about 13,000,000 bales, or enough for the entire season.

It is evident from the present facts, that too much land is already devoted to cotton planting, but not enough to cotton-raising. The distinction is plain. Too much ill-adapted and imperfectly cultivated land is planted to cotton, and the result is a one-third or one-half crop, when if half the area was properly fertilized, given the same amount of fertilizer now used on double the area; and the crop then more compact be given the same amount of attention, now spread superficially over double the area, the results at harvest would be fully as much and possibly more than is now the result from the present acreage.

Putting it in another way: If, instead of planting 40 acres to cotton, for which X-amount of seed is required, and Y-amount of fertilizer, 20 acres be planted (which at once would require half the preparation in plowing, cultivating and planting) the amount of seed required would be 1/2X; a saving of half the cost of seed; the amount of fertilizer remaining at Y, the land would receive a double portion, insuring a greater fertility, which should show in stronger and more productive plants.

The initial cost of this reducing would have been reduced; and in the same way the cost of cultivation would be halved, for the less acreage would require less labor. The cost of picking would be reduced for the same reason. The speed of harvesting would be doubled, securing earlier delivery at the gin or storehouse, and if the modern methods of American agriculture should have been applied during the period from planting to storehouse, in all probability, instead of an half-a-crop of cotton, according to the original scale of halved acreage, the crop would be one-third or one-fourth less, thus reducing the cost of production for a similar quantity under the former methods.

Still another gain would be made. The original area would have allowed plenty of acreage for some other staple agricultural crop, and the whole 40 acres would be in a higher state of cultivation than if they had been devoted solely to cotton. The agricultural ability of the farm would thereby be so much improved and made more valuable.

By a careful selection of seed; planted so as to insure the best stand, covering the ground without interference of the plants, the character of the bolls should be improved; and by this system of selecting each year the best seeds from the earliest appearing plants, marking and saving the bolls on these plants for separate picking and saving of the seeds, the length of time required for the crop from the time it breaks ground to the day the fiber is fit for picking would be reduced, thus possibly avoiding damage from frosts or rains.

Since the cotton boll is afflicted by insect pests, it would be easier by half the time and labor to spray or hunt the insects, on the reduced acreage, which should assure a greater degree of thoroughness in eliminating the pest.

These are but a few of the principal reasons why properly reducing the cotton area would be of advantage to farm, crop, supply and planter.

If the acreage is to be reduced it should be done according to some such well-organized method, the proportion of seed to acreage and work on the same being carefully estimated in advance. The large planters should follow the agreement as to acreage to the letter, and allow the small and less favorably conditioned planters to con-

tinue their own methods; though if this method should be adopted and carried out to the letter it is probable the agricultural resources of the cotton belt would be highly improved. In any case, the antiquated methods of growing cotton should be stopped and modern agricultural principles adopted. These will apply to cotton in Alabama as well as to potatoes in Maine, or corn in Nebraska. The principles are similar; the differences are in the application to peculiar local conditions. So far the cotton crop has been too much of a political and racial crop, and not an agricultural crop. Under modern methods of agriculture, and modern business organization a favorable difference should be obtained.

Another reason why a reduction of acreage, and a very drastic one at that, should be made, is the more satisfactorily to combat the boll weevil, which has extended its depredations altogether too far over the cotton growing area, and has not been eliminated as fast and permanently as modern scientific methods should have effected.

In order to do this, the most drastic way to eliminate the weevil, would be to absolutely stop the planting of cotton in a certain area. A belt several hundred miles wide, from the Gulf to the Ohio River should be absolutely denuded of the cotton plant, thus dividing the cotton territory, and making it possible to fight the weevil within the two areas, with less chance of the insect spreading itself as in former years. This plan may seem drastic, but if accepted, the former acreage could be planted to desirable crops to the advantage of farm and farmer.

Still more drastic, but more sure, would be a campaign, which would limit the cotton area in the present so-called "cotton states," to the state of Texas alone. The campaign would then be on a more limited area and the degree of cultivation might be advanced, insuring increased returns to offset the great reduction in acreage. Then if no cotton was raised, not a plant, forbidding it by statute if necessary, in all the other southern states, it is possible that this area might in one or two years be cleaned of the pest. Then, on the resumption of cotton growing, better acreage would be available, and better methods employed, which would re-establish the industry on a new and safe basis.

It is probable that the latter plan can not be adopted, at least at present, and not until all the present planters shall have become educated to new and modern methods of agriculture. Education in this respect is one of the chief factors in securing agricultural methods of the cotton crop, and it is too important a national resource to be juggled with in any way. Intelligent methods of farming will do more to bring and keep the cotton crop at a paying basis than all the mandates of factors North or South.

The need of central warehouses, where the baled cotton may be stored at nominal rates for a proper market is also important in considering stable cotton prices and reasonable crops. That is a matter requiring the cooperation of capitalists.

The increased use of the cotton fiber in fabrics and other forms of a lower quality than any at present made, is another important aspect of the cotton supply.

After all, it is not entirely a matter of reduced acreage that will keep the cotton crop at a remunerative figure, and the baleage at a satisfactory quantity. The principal need is the proper application of American thrift and common-sense, secured by the education of all concerned in the ways important to their personal interests.

National Association to Meet at Boston.

The annual meeting of the National Association of Cotton Manufacturers will be held at the Copley-Plaza Hotel, Boston, on April 20, 21 and 22. The meeting will open with a business session at 7:30 o'clock on Wednesday evening, April 20, when the president will deliver his address, and reports will be submitted by the secretary, treasurer and standing committees. Following these, at 8:30 o'clock, the Scottish Musical Company will give a presentation of "The Cotter's Saturday Night." The ladies and friends of members will be cordially invited to be present at this entertainment.

On Thursday morning, April 21, at 9:30 o'clock, a group discussion will be held on "Problems of Employment and Housing." W. Frank Shove, former president of the association, will act as chairman at this meeting. William R. Basset, R. L. Wilson and Leslie H. Allen are among those scheduled for addresses. These talks will be followed by a general discussion, to be opened by George M. Dunlop.

A group discussion will be held at 2:00 o'clock Thursday under the auspices of the Research Committee of the Association, when there will be addresses by Alfred E. Jury, Professor G. B. Havens and Everett H. Hinckley on subjects pertinent to research work, etc.

The association medal will be presented at 9:30 o'clock on Friday morning, and at 10 o'clock there will be held a group discussion on "Production and Sales Problems," with William L. Lyall as chairman. Addresses will be given by David R. Coker, Hartsville, S. C., on "The Common Interest of the Grower and Spinner;" by Dr. Hollis Godfrey on the subject "The Balanced Ration in Management;" and by S. H. Ditchett on "The Standardization of Textile Products," to be followed by a general discussion.

The session at 2 o'clock on Friday afternoon will include addresses by Franklin W. Hobbs on "The Interdependence of the Textile and Dye-Making Industries;" by Dr. Thomas Nixon Carter on "The Right Regulation of Immigration;" and by E. Kent Swift, who will deal with the second World Cotton Conference which will be held in Liverpool and Manchester, England, in June.

The final business session will be held at 4 o'clock on Friday, April 22, when the resolutions committee and the nominations committee will submit their reports, and officers and directors elected for the ensuing year. The meeting will close at 7:30 o'clock with a banquet. President Russell B. Lowe will, on this occasion, serve as toastmaster, and the speakers will be of the usual rank and quality. It has been decided, states an announcement from Association headquarters, that the ladies of members shall be invited to participate in the banquet this year, as a hopeful experiment.

Nobody ever becomes a nervous wreck while he is succeeding, no matter how hard he works. He goes by the board only when the tide turns against him, or when he quits work to have a good time.

How Even is "Even Running Work"

BY JAMES ROBERTSON.

Even running or good running work is the Utopia of all section men, second-hands, overseers and superintendents—and most of all the operatives who are affected mostly by any variation that causes ends to break down, together with break backs and thick and thin places in the finished fabric. The more efficient help naturally turn to that mill which presents the best running work for the reason that more sides, frames or looms can be run with the same effort as in a poor and unevenly running mill and with a correspondingly greater pay.

There are so many things that enter into the causes and remedies of uniformity of product that it is not the intention of this article to state the how or why of such conditions, but to merely give figures of just what does exist.

The tests given in this article cover a number of southern mills in widely different sections of the territory, where conditions do vary, so that an idea can be obtained of what the average southern mill is producing in the way of exacting weights, hanks and numbers.

No apologies or excuses are offered for what may seem erratic conditions, but it is very probable that the same conditions would be found to exist everywhere, to some extent, if the proper method of testing were used to determine just what variations are taking place in the different processes.

Each particular phase of manufacture is taken up showing how each varies and then in the final summary it may be seen how the evenness of each process determines, to a great extent, the evenness of the next, and so on to the "feel of the cloth."

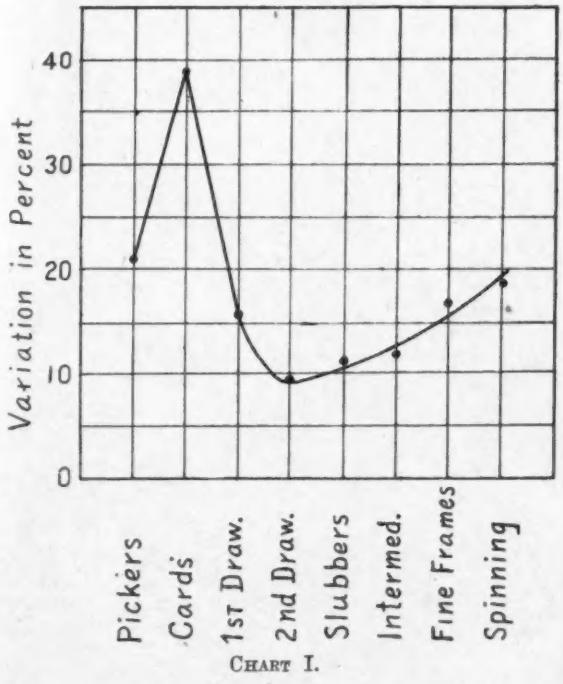


Chart I.

This chart shows the curve of how the average variations in the eight mills tested ran, and sums up just how even, "even running work" is.

Pickers.

No part of the mill is open to any more possibilities for improvement in the character of the work run than the picker room. Here lies the foundation of even running work where the thick and thin places later result in light and heavy slivers which are sometimes averaged up in the drawing, and again averaged down too, when a number of uneven portions come together.

Lap after lap may weigh very nicely to the quarter of a pound on the scale, yet yard after yard may weigh from one ounce to three ounces different. This can be but shown by the 144 tests of individual yards at each mill for a number of mills.

Here are the records of twelve laps that weighed the standard of 46 pounds, and note how they varied from the accepted 13.7 ounces set for twelve separate yards of each lap tested.

Standard Weight—13.7 ounces per yard

Maximum Variation in Lightest and Heaviest Yard in Each Lap.

Lap No.	Variation in ozs.	Lap. No.	Variation in ozs.
1	.42 oz.	7	.89 oz.
2	.64 oz.	8	.73 oz.
3	.64 oz.	9	.52 oz.
4	2.74 oz.	10	1.35 oz.
5	.55 oz.	11	.64 oz.
6	.84 oz.	12	3.56 oz.

Total maximum variation of 3.56 oz. or 26 per cent from the standard weight of each yard.

Table I shows the results of tests covering eight mills in regard to the uniformity of the picker laps.

	Standard of Weight of Lap	Individual Yard Variation in Ozs.	Per Cent Variation
Mill No. 1	12.25 ozs.	1.438 oz.	11.7
Mill No. 2	11.15 ozs.	2.024 oz.	18.2
Mill No. 3	13.40 ozs.	3.780 oz.	27.5
Mill No. 4	13.50 ozs.	4.84 oz.	35.8
Mill No. 5	17.00 ozs.	2.52 oz.	14.8
Mill No. 6	11.85 ozs.	2.64 oz.	22.3
Mill No. 7	12.75 ozs.	2.70 oz.	21.2
Mill No. 8	15.50 ozs.	2.34 oz.	15.08

Average percentage variation, 20.94.

Table I.

We may be very safe in assuming that taken over the entire range of possible unevenness in picker laps they will vary as much as 21 per cent from the highest to the lowest weight of the individual yard in the picker room, and as to the smaller portions of 12 inches or 24 inches the percentage may be still greater. This percentage may seem high, yet it is only an average and in some mills of the table it will be seen that it goes even higher.

Cards.

Tests on cards show results of variation that appear rather unnerving, but much must be taken into consideration in judging the results. All tests were made at intervals when the cards were under as near the same conditions as possible. A number of cans were taken before the operation of stripping was begun and a number of cans were taken after the operation. Starting at the top of each can and going to the bottom, twelve yards were separately taken and weighed to show the variation in grains per yard of the silver.

Subtracting the lightest yard found from the heaviest yard found during the entire series of tests, a fair idea is obtained as to the extent of variation in the card slivers. Each variation of the lap fed is productive of a different weight in the sliver produced if the variation in the lap is very marked.

Table II shows the results of tests made in following up the eight mills which were tested in the picker room, card room and spinning room complete; this table gives the results of the card tests.

	Weight of Sliver In Grains	Maximum Individual Yard Variation in Grains	Per Cent Variation
Mill No. 1	62 grs.	22.3 grs.	36
Mill No. 2	45 grs.	11.0 grs.	24.4
Mill No. 3	65 grs.	13.6 grs.	20.9
Mill No. 4	60 grs.	19.0 grs.	31.6
Mill No. 5	54 grs.	20.7 grs.	38.4
Mill No. 6	56 grs.	34.0 grs.	60.7
Mill No. 7	55 grs.	23.6 grs.	43.0
Mill No. 8	75 grs.	38.2 grs.	50.9

Average percentage of variation, 38.2.

Table II

It is seemingly a rather high percentage to assume 38 per cent as the average maximum variation in card slivers, but this was found to be the exact fact as shown.

This 38.2 per cent, upon second consideration, means taking the standard average weight per yard as a basis and dividing this into the average maximum variation in grains per yard, giving the percentage of variation. This gives a fair basis for comparison, regardless of the standard of weights, hanks or numbers produced.

Thick and thin places in the picker laps certainly come to the surface upon the application of draft, as in the cards, and we can then see how important it is to watch these points. It might be stated that a cotton mill manager certainly goes hand in hand with the definition of the word "genius" in that both must show an infinite capacity for detail. It is the smallest of facts that require the utmost attention in order to acquire even running work.

Drawing Process.

Wherever there is a numerical equality between drafts and doublings there is a marked increase in the evenness of the product as is shown in the tests of the drawing processes. There were 144 tests made for each of the eight mills on the drawing processes; 72 on the first process and 72 on the second process. With a draft of approximately six and doublings of six, marked improvement in variation is shown which compensates for the unevenness of the cards to a great extent, but only so far as the cards themselves varied. High variation in card slivers also means a high variation in the first drawing although to a lesser degree which may even be again traced back as far as the pickers.

Table III shows the results of tests on the drawing processes with the average percentage of variation.

First Drawing Process.

	Standard Weight in Grains per Yard	Maximum Variation	Per Cent Variation
Mill No. 1	65 grs.	11.1 grs.	17.1
Mill No. 2	50 grs.	6.5 grs.	13.0
Mill No. 3	74 grs.	7.9 grs.	10.6
Mill No. 4	68 grs.	9.6 grs.	14.1
Mill No. 5	58 grs.	8.2 grs.	13.9
Mill No. 6	66 grs.	17.3 grs.	26.2
Mill No. 7	62.5 grs.	9.5 grs.	15.2
Mill No. 8	83 grs.	11.5 grs.	13.8

Average percentage of variation, 15.5.

Second Drawing Process.

	Standard Weight in Grains per Yard	Maximum Variation	Per Cent Variation
Mill No. 1	72.0 grs.	8.0 grs.	11.1
Mill No. 2	52.0 grs.	4.5 grs.	8.6
Mill No. 3	81.0 grs.	6.1 grs.	7.5
Mill No. 4	76.2 grs.	10.6 grs.	13.9
Mill No. 5	62.0 grs.	2.8 grs.	4.5
Mill No. 6	74.0 grs.	7.0 grs.	9.4
Mill No. 7	68.0 grs.	8.5 grs.	12.5
Mill No. 8	....	....	....

Average percentage of variation, 9.6.

Table III

We find a decreasing ratio of unevenness due to the large number of doublings and correspondingly low draft compared to these doublings. A variation of 15.5 per cent on the first drawing is reduced to the variation of 9.6 per cent on the second drawing. Figuratively speaking the sins of poor carding and picking are atoned for by the drawing processes to some extent. A good average variation of about 15.5 per cent on the first drawing and 9.6 and 10 per cent on the second drawing may be taken as a basis for comparison in this article in the matter of drawing slivers.

Fly Frames.

In the following table the results are shown of twelve tests on every fly frame in each of the mills in question on the same lot of cotton as was tested in the drawing processes. As these figures cover the same distributed eight mills, a good idea can be obtained of the evenness of roving in the South.

Slubber Frames.

	Standard Hank No.	Variation in Hank No.	Per Cent Variation
Mill No. 1	.48	.05	10.4
Mill No. 2	.74	.045	.67
Mill No. 3	.36	.01	2.8
Mill No. 4	.50	.07	14.0
Mill No. 5	.56	.02	3.6
Mill No. 6	.43	.03	7.0
Mill No. 7	.43	.05	11.6
Mill No. 8	.40	.10	25.0

Average percentage of variation, 10.17.

Intermediate Frames.

	Standard Hank No.	Variation in Hank No.	Per Cent Variation
Mill No. 1	1.10	.12	10.9
Mill No. 2	1.70	.14	8.2
Mill No. 3	.80	.07	8.7
Mill No. 4	....	...	....
Mill No. 5	1.45	.19	13.1
Mill No. 6	.94	.09	9.6
Mill No. 7	1.12	.17	15.2
Mill No. 8	....	...	....

Average percentage of variation, 10.9.

Fine Frames.

	Standard Hank No.	Variation in Hank No.	Per Cent Variation
Mill No. 1	3.40	.66	19.4
Mill No. 2	5.40	.84	15.5
Mill No. 3	1.91	.27	14.1
Mill No. 4	1.60	.25	15.6
Mill No. 5	4.44	.69	15.5
Mill No. 6	3.02	.50	16.7
Mill No. 7	3.64	.75	20.6
Mill No. 8	1.00	.12	12.0

Average percentage of variation, 16.7.

Table IV.

These tables show conclusively that the variation in product throughout the card room is dependent on the draft and doubling ratio; for with lower drafts and more doublings better running work is obtained, which leads to the old story of light weights and short drafts.

Spinning.

Only the warp spinning will be given to suffice as an example of the spinning room. As an idea of evenness it should be remembered that these tests cover a variety of yarns on practically every make of spinning frame, some new and others old, some well repaired and others whose upkeep has been neglected.

Warp Spinning.

	Standard Yarn No.	Variation in Yarn No.	Per Cent Variation
Mill No. 1	21.5s	3.93	18.3
Mill No. 2	30.0s	6.15	20.5
Mill No. 3	14.5s	2.46	16.9
Mill No. 4	10.8s	1.47	13.6
Mill No. 5	24.0s	4.72	19.6
Mill No. 6	19.6s	3.74	19.1
Mill No. 7	21.5s	2.99	13.9
Mill No. 8	8.0s	1.49	18.6

Average percentage of variation, 17.6.

Table V.

Mill No. 1 is using single roving while Mill No. 2 is using double roving in the creel, yet Mill No. 2 varies more than Mill No. 1, which may not be due so much to the use of double roving but to the fact that the spinner allows the one end of the roving to run out and the traveler is not heavy enough to break down the end as it should.

Summary of Tests.

The following Table VI shows each mill and the percentage of variation in each process as also the general average.

Process	Mill No. 1	Mill No. 2	Mill No. 3	Mill No. 4	Mill No. 5	Mill No. 6	Mill No. 7	Mill No. 8	Average Per Cent Variation
Finisher Lappers.	11.7	18.2	27.5	35.8	14.8	22.3	21.2	15.1	20.94 ..
Cards	36.0	24.4	20.9	31.6	38.4	60.7	43.0	50.9	38.20
First Drawing....	17.1	13.0	10.6	14.1	13.9	26.2	15.2	13.8	15.50
Second Drawing..	11.1	8.6	7.5	13.9	4.5	9.4	12.5	....	9.6
Rubber Frames..	10.4	6.7	2.8	14.0	3.6	7.0	11.6	25.0	10.2
Inter. Frames....	10.9	8.2	8.7	....	13.1	9.6	15.2	....	10.9
Fine Frames.....	19.4	15 5	14.1	15.6	15.5	16.7	20.6	12.9	16.7
Warp Spinning....	18.3	20.5	16.9	13.6	19.6	19.1	13.9	18.6	17.6

Table VI.

Tracing down each mill we see if the first processes vary considerably then the remaining processes are likely to be just as irregular. So if we watch most closely the variation in the first processes then our yarn numbers will not be varying so greatly.

The second drawing process is most even of all the processes and from here on the variation again increases as the draft and doubling ratio increases.

It is hoped that these figures and charts will enable mill managers to get an idea of the increasing variations in the different processes from the second drawing on and the importance of watching the variation in the earlier processes to produce the best possible sliver at the second drawing which is the place where the future evenness of the yarn is usually determined.

The Practical Technic of Mule-Spinning

BY ARTHUR L. BURTON.

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The Sector.

Probably the least generally understood setting on the mule is that of the sector. This subject will be treated fully and at some length in this article, so that a thorough understanding of its influence on the shape of the cop may be grasped.

The sector finger or bracket is keyed to the copping faller shaft at the headstock and is joined to the bootleg by a stud, sometimes called the sector stud. In some makes of mules it is in the center of the mule-head, in some at the side, in some it carries the backing-off chain, besides being coupled to the boot-leg, in others the backing-off chain has a separate finger of its own on the faller shaft, and the boot-leg is coupled to the copping faller finger at the side of the mule-head—all according to the make or type of mule. But, in speaking of the sector, we will always have in our mind's eye the boot-leg, sector stud and faller finger on the copping faller shaft at the head-stock.

In describing both the setting and working of the sector, let us suppose or imagine the spindles on the mule are bare. The reader will follow the explanations better. It will be seen that when the builder is wound completely up by hand ready for the start of a new set of cops, the copping faller can be backed off by hand by grasping the handle on the fallers for that purpose, from tip of spindle to bolster. It will also be seen that the faller wire describes an arc of a circle, and does not travel in a straight line. By backing the fallers off by hand, slowly for a number of times, this will be seen and understood by the reader. It will be noticed that the bootleg is in much the same position and relative importance to the copping faller wire as the long beam driving the flywheel of an old-fashioned reciprocating engine. The bootleg derives its peculiar up and down motion during winding from the profile of the copping rail, the sector stud providing the fulcrum governing the circular motion of the copping faller wire during winding.

It is necessary that we explain here the fact that the copping faller wire does not travel at the same speed (during the backing off from tip of spindle to bolster) as it would if it traveled in a straight line. Traveling in an arc of a circle there is less vertical motion when passing through the center of the arc. Perhaps, because of its importance that the reader should thoroughly grasp this fact, an illustration might not be out of place. If two men should start at the same time to cross a hill, and one man should walk over the hill and the other should go through the hill by means of a tunnel, both men traveling at exactly the same speed, the man going through the tunnel would get to his destination first because he traveled in a straight line. The man going over the hill would be delayed, although he traveled at the same speed as the other fellow, yet in both cases the same object would be achieved. Precisely the same thing happens in winding on the mule. The copping faller wire travels through an arc of a circle, and at the center of the arc the vertical motion is slowest, hence it is very important to the shape of the cop just where the center of the arc is placed. After reading this article carefully, the practical man will be able to place the center of this arc of the circle where he pleases, and sector setting will be a pleasing and sometimes astonishing oc-

cupation in the results shown.

How to Set the Copping Faller Sickles.

First, measure the bare spindle from tip to bolster (above spindle rail). Then mark the spindle in center exactly. (Select a spindle near the mule-head.) Get a pair of calipers and measure the exact diameter of the copping faller shaft. Have an extra sector stud made in the shop, about an inch longer than the stud used in the boot-leg. On this extra inch of stud have a bowl or roll keyed, of exactly the same diameter as the copping faller shaft. See Fig. 10; 1 being the regular sector stud, 2 being the spare stud for the fixer to use during setting.

Withdraw the sector stud, and replace it with the new stud. Do not tighten the setscrew on the stud, however, as this stud is only to be used temporarily for setting the sector. Now get a spirit level and place it on top of the

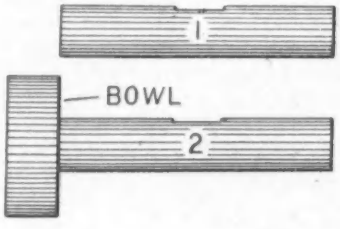


FIG. 10

new sector stud bowl and allow it to rest on the copping faller shaft also. It will be found that the builder motion will have to be wound down slowly until the bulb in the level is in the center. If the counter faller shaft interferes with the correct resting of the level on the sector stud bowl and the copping faller shaft, a piece of wood must be cut to allow for it, similar to that shown in Fig. 11, at 1. The level is shown at 2, copping faller shaft at 3, and sector stud bowl at 4, and counter faller shaft at 5.

When the builder has been wound down sufficiently so that the level bubble is in the center, (showing that the top of the sector stud bowl and the top of the copping faller

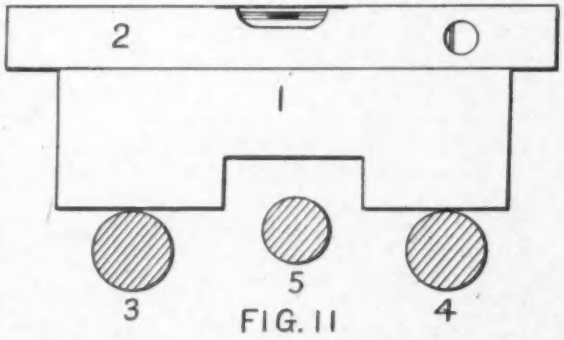


FIG. 11

shaft are absolutely level with each other) then examine the position of the copping faller wire. It should be exactly in the center of the arc, and opposite the center of the spindle at the mark. By the aid of a steel rule it can be seen at once whether the copping faller wire is higher or lower than the mark on the spindle. If it is an inch higher than the mark then all faller sickles must be lowered one inch, and if lower than the mark, then they must be raised accordingly, always making the adjustment on the boot-leg following the setting of the faller sickles.

After determining the amount that the copping faller sickles must be raised or lowered, measure the distance from the tip of the spindle to the copping faller wire before starting to alter the sickles. Be sure to memorize or make a note of this measurement. For the sake of a clear illustration we will suppose this measurement to be four inches.

Now raise or lower all copping faller sickles to the center of the mark on the spindle. After having done this in good shape, then shorten or lengthen the boot-leg until the copping faller wire has been brought back to the exact measurement of four inches as before. This brings the arc of the circle opposite the center of the spindles, and by altering the length of the boot-leg we have assured ourselves that the yarn will wind in the correct place on the spindle, as it did before altering the sickles.

The question now arises as to what difference a sector

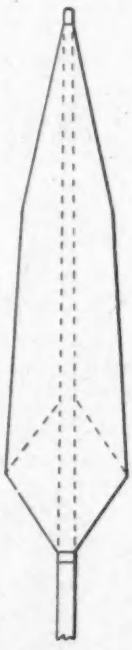


FIG. 12

FIG. 13

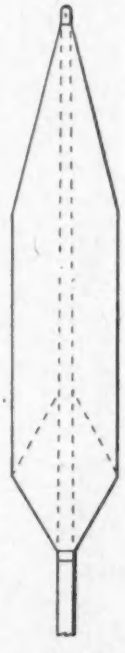


FIG. 14

setting will make in the shape of a cop. Before examining the shapes of the cops shown at Figures 12, 13 and 14, let us examine minutely just what takes place during the actual winding of yarn on the cop as the copping faller wire travels its arc of a circle.

It is reasonable to consider that that part of the winding where the copping faller wire passes through the center of the arc should be the center of the cop (or spindle) so that any lack of speed in the vertical movement, either up or down, should be equally divided over each half of the cop. If the center of the arc should be below the center of the spindle, then we are going to have more yarn on the lower half of the cop and less on the upper half, because the copping faller wire will have a slower vertical movement on the lower half of the cop. (See Fig. 12.)

If the center of the arc is above the center of the spindle, then we shall have a slower vertical movement in the upper half of the cop and a quicker vertical movement in the lower half of the cop, and more yarn will be

wound on the cop in its upper half than in its lower half. (See Fig. 13.)

By having the center of the arc in the center of the spindle, we equally divide this variable speed of the copping faller wire both upwards and downwards and assure ourselves of a cop similar to Fig. 14.

It must be understood right here that a standard setting for the front copping plate must be made, so that the right size of cop bottom will be made to correspond with a correct sector setting. If a front copping plate is set with a cop bottom too big, then the lower half of the cop has a tendency to show big also, whereas if the front copping plate is set to give a small bottom the upper half of cop will show up rather bigger in diameter than it should. By adopting a standard setting of the front copping plate with a correct sector setting, a straight cop similar to Fig. 14 should be obtained.

There are cases, however, where the center of the spindle should not be used as a mark for the center of the arc. For example, it may be necessary to run pin cops on a big spindle and on broad gauge mules, and then the cops have to be started quite a way up the spindle because of the necessary specifications relative to the diameter of

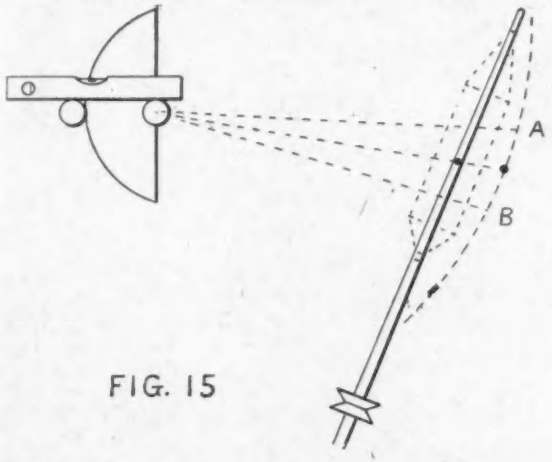


FIG. 15

the hole through the cop. Then, it is safe to get the center of the spindle for a mark, measuring from the tip of the spindle to the bottom of the tube, or where the cop begins on the lower part of the spindle. Then get the exact center of this measurement. This gives the center of the working part of the spindle for pin cop spinning. Then set the sector to this center, and it should make straight cops although it is using more of the upper half of the spindles than the lower.

The reader is referred to Fig. 15 for an illustration showing the mark in the center of the spindle, the center of the arc opposite the mark on the spindle, and the level on the copping faller shaft and sector stud bowl. A and B represent wrong settings; A causing the shape of the cop illustrated at Fig. 12, and B the cop shown at Fig. 13.

After getting familiar with the setting of the sector, it may be found necessary to set the copping faller sickles off center slightly, either way, in order to get a perfectly straight cop. The man in charge will find, after thoroughly mastering this setting, that a great deal of work will be eliminated for him later on, because the faller wires will ride better, the mule will wind better (everything else being in good shape), less waste in winding or weaving will result on account of a better and more evenly divided tension during winding, the cops will pack better, and the cop noses will be more uniform throughout the cop.

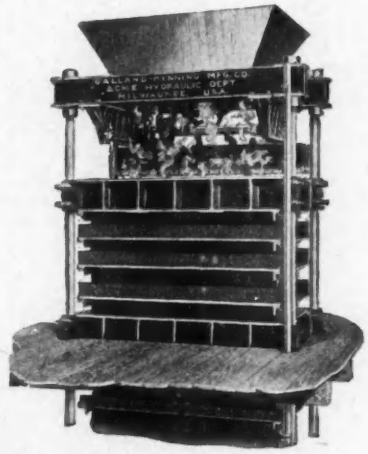
[This is the fourth article in the series on "copping." Others will follow.]

Handling Waste Material.

Little attention has been given in the past to more advanced, efficient methods and machinery for the handling of waste material. This is a very important national industry and it played a prominent part in the prosecution of the late war.

The handling of waste materials has for years been carried on in a haphazard sort of manner, and with comparatively few exceptions, the improvised make-shift equipment used, relatively increased the cost of handling with the result that the dealers' profits were swallowed up in labor costs and the purchaser and ultimate consumer were compelled to pay a higher price.

The Galland-Henning Mfg. Co., of Milwaukee, Wis., realized, and went so far as to demonstrate at their own expense, that with proper handling facilities the dealer obtained a greater margin of profit and could sell to the mill at a better price so that a mutual benefit resulted. Therefore, they designed hydraulic equipment of this class to meet the problems of the waste packer. In this con-



nection they considered the transportation proposition; the problem of warehouse facilities and the prestige which a well packed bale would bring to a dealer when his material was presented for sale.

The first hydraulic machines built were of the four-door type so arranged that the top of the machine came above the first floor in order to allow a sufficiently deep box to contain sufficient material to complete a bale without a great deal of tamping. Difficulty was experienced under high pressure in retaining the doors in their position with such locks as could be provided for this work.

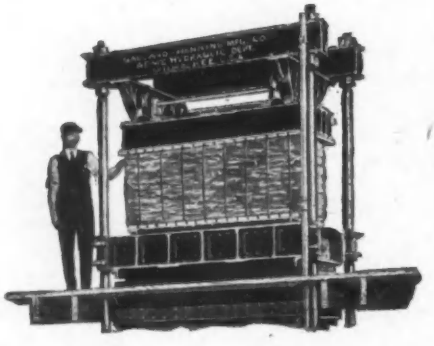
The final pressure on the bales took place within the space occupied by the doors, which were hinged on the tension rods or columns, that carry the load between the top and bottom platens, with the result that a lateral strain was thrown on these tension rods, causing them to deflect

and pull the doors away from the latch or locking device.

In pressures of 50 up to 75 tons, the difficulty of holding locks in place was not so serious, but 50 or 75 tons is not sufficient pressure to give a commercially dense bale. In fact not less than 100 tons is absolutely necessary to produce a bale to meet present day transportation and warehouse conditions effectively. Under 100 tons pressure and upwards the problem of locking devices developed and the solution was reached by the Galland-Henning Co. patent of a lockless, doorless press, as shown in the illustrations.

In the doorless design, it is unnecessary to throw any lateral strain on the tension rods; the box being of one piece construction, re-inforced at a point where the greatest strain takes place or on a line formerly occupied by doors.

In the operation of the press, the press box may be of any depth from seven feet six inches to fourteen feet, depending upon the class of material to be handled, This



box is equipped with guides which run on the four vertical columns or tension rods. To fill the box it is necessary to raise it to its highest upward position. This is done by a small hydraulic or air cylinder. The top is left open and the material is loaded from a hopper on the floor above. The hydraulic pressure platen is started from the box bottom and the paper or waste is gathered above the floor line where the final compression takes place, and the bale is formed. The box is allowed to slip back so that the finished bale is exposed for wiring. The ram is slightly released in order to allow the press cover or upper platen to be removed from the bale. These bales will weigh approximately 1,000 pounds with mixed paper or 1,200 pounds with rags or cotton waste. The bale measures 72 x 27 x 27 or 30 inches, so that about 50,000 pounds of material may be loaded into a 36 foot car without tiering.

At the mill, where floor space and warehouse room is to be considered, the annual saving brought about by this equipment would mean a substantial figure, and material in this form appeals to the purchaser.

Having overcome the waste handling problem, the next problem to be encountered by the Galland-Henning Company was that of demonstrating to the waste dealer that he is paying for these machines whether he purchases them or not; however, it is easily proven that any equipment that will save labor and reduce the cost of production is an investment rather than outlay or expense; and anything a man needs in his business he pays for whether he purchases it or not.

The Dependable Man.

There is a type of man who is built for success. He may have genius or just ordinary talent—no matter. The point is that he always "arrives." While others plod a weary way, he gets ahead.

Those who take note of his progress often cannot account for it. So they say he is "lucky." Or they whisper it about that he has a "pull with the boss."

But the secret is deeper than that. He is a man who is absolutely dependable.

Make yourself dependable, and you come as near being indispensable as any of us can hope to be. You will be the last one your employer will wish to part with, and the first one that he will want to promote to greater responsibilities.

But do not be deceived. Dependableness is a rare accomplishment—so rare that every executive is on the lookout for it wherever it may be found. It cannot be acquired by wishing for it. It is the prize that comes from self-mastery.

What is a dependable man? You can tell him by these ear-marks:

First, he is one that you can rely upon to do his own thinking. Business requires thinking, and someone must do it. The dependable man never sidesteps his share nor tries to pass it along to someone else. You always find him on the alert. His brains do not flit away on vacations, leaving his job without a guardian.

Next, he is one whose judgment you can trust. He doesn't do foolish things. He knows his own abilities: and, not being conceited, he is equally aware of his own weaknesses. He has the happy faculty of understanding other people's viewpoints and seeking their advice when he ought. Also he knows when *to act on his own initiative.*

Finally, he is a man you can listen to, taking stock in whatever he says. You are sure that he speaks only after due reflection. He does not talk to the galleries or for the purpose of "grinding his own ax." He makes his suggestions and pleads his cause solely in the interest of the business.

Such a man is safe. Important duties may be entrusted to him and he will handle them with diligence, good sense and earnestness.

If you are looking for the quickest route to opportunity, learn to be this type of man.

Be dependable—a burden lifter. By lightening the anxieties of those who must give account of your doings, you will make yourself their favorite. And they will help you achieve your ambitions.—*J. Ogden Armour, in The Armour Magazine.*

The Economy Textile Supply Company, Asheville, N. C., has been organized for the purpose of marketing new inventions in textile manufacturing. The company was established by M. H. Flowers, L. N. Catlett and W. W. Bruce, all of Asheville. Among the inventions which they have taken over is the Casey self-tightening gear and pulley attachment. Marion R. Casey, the inventor of this device, is now representing the new company, with headquarters in Williamston, S. C.

Weaving Section Meets at Greenville

A large representative attendance, a manifest interest in a spirited discussion, together with a generous portion of true Greenville hospitality, made the meeting of the Weavers' Section of the Southern Textile Association at Greenville, S. C., on February 25, a live, interesting and beneficial affair.

This meeting was called in accordance with the plan of the Association to hold practical discussion meetings for mill superintendents and overseers and others interested, on the problems of each manufacturing department of the mill. It was held on the general plan of the two previous sectional meetings, with two sessions—one in the forenoon and the other in the afternoon—with a "Dutch" luncheon between the two sessions. The meetings were held in Cleveland Hall. It was a regrettable fact that it was at times an impossibility to understand some of the speakers, because of the staccato notes produced by a crew of riveters assiduously applying themselves to construction work on Greenville's new sky-scraper which is being erected in close proximity to Cleveland Hall. This difficulty was alleviated somewhat toward the close of the morning session and in the afternoon session because of the fact that the men grouped themselves closer together, in the side of the hall furtherest from the riveters.

The Morning Session

was opened with an address of welcome by Col. Holmes B. Spring, of Greenville, formerly a member of the 30th Division, who declared to the visiting delegates that Greenville welcomed them, as always, in a business, social, commercial and spiritual way, and extended to the mill men the cordial good wishes of the citizenry of the city. Milton G. Smith, chairman of the local entertainment committee, then made an announcement concerning the entertainment planned for the mill men during their visit.

At this juncture, W. H. Gibson, Jr., superintendent, Union-Buffalo Mill, Union, S. C., who is chairman of the Association's Sectional Committee on Weaving, assumed charge of the meeting, and Mr. Gibson is to be commended upon the dispatch with which he conducted the discussion in the two sessions.

In his opening remarks, Mr. Gibson said: "I am glad to see so many present today. I think it would be well to not look away up high in our discussions here, but rather to get down on a plain, level basis. We want to discuss the small things and talk in a manner that will be understood by all. This is not a pleasure trip, but we are here on business; on duty just as though we were at the mill."

He then read a letter from F. Gordon Cobb, of Lancaster, S. C., who is general chairman of the Sectional Committee, in which Mr. Cobb expressed his regrets at his inability to be present. Mr. Cobb sent with his letter a set of questions on various phases of weaving to be discussed at the meeting.

The chairman called attention to the set of questions on slashing and weaving that was in the hands of the majority of the men present, and asked that these questions be answered as fully as possible. He stated that the discussion of the day would be confined as nearly as possible to the questions in this list, but pointed out that the meeting would be an open one and that any other question pertaining to the subjects in hand would be welcome.

The Discussion on Slashing.

The question on slashing stated that it was planned to hold this discussion to approximately 30s warp to be used on plain goods, and the first question asked by Chairman Gibson was, "What is the best starch to use on 30s warp yarn for print purposes?" Mr. Gibson declared that there were many different kinds of starch and that it was desired to establish what the best kind is for the mill to use in order to secure a good running warp.

H. H. Boyd, president of the Southern Textile Association, who assisted the chairman in the conduct of the meeting, asked the specific question, "How many present are using potato starch?" A few men indicated that they were, while the majority seemed to be using corn starch.

Opinions were then asked for as to the relative merits of the two starches for the work under discussion.

H. H. Brown, assistant superintendent, Roberdel Mfg. Co. No. 2, Rockingham, N. C., replied, "We use potato starch for making very fine goods and we find that we get a smoother finish. I get very good results and a better running warp." In reply to question from the floor, Mr. Brown stated that the work runs much better through the use of the potato starch, and that he uses around 20 per cent less of this starch. Cameron MacRae, Arabol Mfg. Co., pointed out that potato starch should not be cooked as long as corn starch, and asked users of the former if they had ever tried cooking it for 30 minutes only. Mr. Brown stated that he cooked potato starch from 45 to 60 minutes; and that corn starch is cooked about the same time.

The next speaker was W. B. Williams, overseer of weaving, American Spinning Co., Greenville, S. C., but the music from the battery of high-powered riveting machines which was wafted at intervals over to the hall made it impossible at times for many of those present to understand Mr. Williams, who was in the rear of the room, as he spoke. The speaker declared that he does not advocate boiling starch a certain time, though he was formerly of the opinion that it was the proper thing to cook starch a certain period of time. It is his practice to shut off the steam immediately the starch is done, and he said that it is wrong to keep the steam on too long, as there will occur variations that would not otherwise be experienced. He stated that he gets very uniform results by his practice of not cooking the starch a certain length of time—shutting off the steam when the starch is done.

Asked how he knows when the starch is done, Mr. Williams replied that the starch shows up in a clear liquid form and is thoroughly dissolved. He stated that the ability to determine when the starch has finished cooking can be learned through experience, and that many slasher men are not able to do this. He applied the principle of old-time soap-making to this instance.

Frank G. North, Arnold, Hoffman & Co., Atlanta, stated that he agreed with Mr. Williams, and pointed out that some starches are alkaline and some are acid, and that different starches gelatinize at different temperatures and therefore there can be no certain time set for starches to be cooked. "You have to judge by the looks, as Mr. Williams says."

Mr. Gibson asked what fluidity of starch is best, and

Mr. North answered the question by saying that it depends upon the mill man; some like a thick starch while others prefer a thinner fluidity. Most any starch can be used with success, he asserted, as it depends not on the starch but on the man.

Opinions were expressed that if it were possible to learn from experience as to just when starch is done, then it should be possible to determine from this experience with various starches the proper length of time starch should be boiled for different work.

After some further discussion on the subject, the chairman asked the men how many were cooking their starch for one hour and several indicated that they were. One man cooks starch for 30 minutes, and another cooks it for 1½ hours, it was indicated by further responses.

An endeavor was made by the chairman to ascertain at what temperatures the men present cooked starch. Some indicated that they were cooking at 212 degrees; one man said he cooks starch at 200 degrees.

L. T. Curry, overseer, Lancaster Cotton Mills, Lancaster, S. C., asked how many present had had experience with recording thermometers on the size kettles, and several indicated that they had had such experience. Mr. Curry then asked what temperatures were used in size kettles. "I use a recording thermometer in my size kettle," he continued, "and boil the size at 212 degrees. You cannot cook it in 30 or 40 minutes. I am using a thin boiling starch and boil for 45 minutes." Mr. Curry was questioned concerning the viscosity of his starch when it is boiled for 45 minutes, and replied that he had never made tests along that line.

J. V. McCombs, superintendent, Buffalo (S. C.) Mill, said that he has recording thermometers on the size kettles and size boxes, with a temperature of 212 degrees in the kettle. He cooks for 45 minutes at a temperature of 212 degrees, and finds that the condensation is well taken care of, he continued.

At this point Mr. Boyd said, "I think possibly we might get some valuable information here on cooking starch for sizing warps. We have two men here who have recording instruments on kettles and size boxes, and if they would try out after they had cooked the starch to see how viscous the size was, we could then find out whether there was variation in cooking the starch under certain temperatures, so that we might learn something from this—just to know whether there is any variation after cooking, and how to cook the starch."

Mr. North pointed out that in discussing temperatures it should be kept in mind that 212 degrees is the boiling point at sea level and that the location of the mills should be taken into consideration.

Mr. Warren, Draper Corporation, asked for information on the preparation of the starch and water together before boiling, and Mr. Hoy, of Spartanburg, stated that "we have one amount of water we use and put the starch in slowly and let it run (agitate) five or ten minutes. Then we turn on the steam and let them get warm and then put in the compound slowly and cook for 50 minutes. We use 40 ounces of starch to the gallon of water."

It was advised as a good practice to arrange to not have the kettle hot when putting in starch, and to draw the water in with the stirrers running to keep the water cool. One man stated that he never has a temperature above 70 degrees in the kettle while putting in the starch. This man puts in a bucketful of water at a time, he declared. He puts in the compound before turning on the steam, and then turns the steam on by degrees.

Practically all the men at the meeting weigh their starch, it was indicated in response to a question by Mr. MacRae, Arabol Mfg. Co. Mr. MacRae also asked, "Do you find it profitable to put the size in before or after putting in the starch?"

The chairman then put forth the question, "After you put in the starch, how many put in the compound before it is boiling?"

"In the question you ask, would it not be a good idea to find out what system is being used?", questioned Mr. Hogue, overseer weaving, Exposition Cotton Mills, Atlanta, Ga. "In our mill we have the circulating system and I sometimes mix a day's stirring before cooking. We have four different vats in the basement and I mix a day's stirring before cooking with starch and ingredients and then pump it to the cooking kettle."

Mr. Williams, American Spinning Co., said he gets his water for the slashers from three wells near the mill which insures him of having cold water all the time. "We keep the agitators working all the time," he said, "and we find that when the granules get in cold water they explode and dissolve much better. I get the size warmed up and working good and then put in the compound. I cook my size with steam at a pressure of 60 pounds. When I turn on the steam I do it gradually and close the kettle when it is done and shut the steam off."

"We measure our water to start with," continued Mr. Williams, "I cook in a 160-gallon kettle and when my size is done I have a kettle full of size. A slow boil gives a smooth yarn. I do not boil my starch in the size vat, but keep it to just a slow boil in the kettle."

Mr. Williams said that he uses different amounts of starch for varied work. For instance, a close weave will take a little more starch. "I use a different amount of starch for 24s and 30s," he said.

Mr. MacRae asked whether in changing the proportion of the starch did Mr. Williams not automatically change the proportion of softening agents. "Does not the percentage of starch control the percentage of size material?" he questioned.

"Yes," answered Mr. Williams, "always in the starch and not on the yarn. I add and maintain a seven per cent size when making warps, which figures out in my product. It is true that if I want to maintain the same on both numbers I must be down on the starch on the 24s; these latter numbers will take a little more size." "I am careful," declared Mr. Williams, "about the size jackets and I don't have three laps a year to cut off on account of their sticking to the cylinders, because I dress the yarn."

The next question to be asked, "What is the approximate percentage of size for best running work on 30s?" Several of those present indicated that they were putting on eight per cent; a few were using ten per cent; and one man indicated that he was putting on six per cent.

The chairman then asked for opinions on the best percentage of size on all kinds of warp yarn. Five advocated putting on eight per cent; three said ten per cent, and one man would put on twelve per cent.

The men were then asked to enter into a discussion of the circulating system. Several indicated that they were using this system and Chairman Gibson asked, "What are the advantages of this system? Does your size get thinner and weaker?"

Mr. Boyd then asked for opinions on whether or not it would be possible to establish if the mills could depart from the human element in making size, by using instruments for recording purposes.

Alonzo Iler, Greenville, S. C., expressed the opinion that a great many troubles could be overcome in the making of size by the use of distilled water in its preparation. He explained that in the making of size, distilled water is produced and that this water could be utilized, and by having a suitable tank, this water—warm from the process—could be cooled for use. He added that in the making of size, the starch should be put in water well luke-warm, and should be stirred for 20 minutes at least.

To bring out the value of soft water in this work, Mr. Iler pointed out that in the old method of making starch for domestic use, the housewife could satisfactorily use rain water, but that when it was necessary to employ well water, the starch did not work out nearly so good.

Mr. Gibson asked for opinions on the use of soft water. He declared that he had considered using it for some time, but had encountered the difficulty that it was hard to handle. He thought, however, that it would be a great thing if it was possible to use soft water in making size.

"In one mill where I worked once," said J. V. McCombs, "the water was so hard that I couldn't possibly make size." He explained that after using a certain kind of powder in the water, the size came through all right.

W. W. Greer, overseer weaving, Ware Shoals (S. C.) Manufacturing Co., stated that in his opinion the mills cannot get a man who will watch size close enough. He related an experience he once had when putting in recording thermometers on his size kettles without informing the slasher man of his action. After installing the recording instruments, he instructed the slasher man to boil the size for one hour. The next morning the man reported that each batch of size had been boiled exactly the specified time. Mr. Greer said he then examined the charts of the recorders and these indicated that one batch had been boiled 37 minutes, one 23 minutes and another for one hour and 20 minutes. He again asked the slasher man, who reported that each batch had been boiled an hour. Mr. Greer then exhibited the chart, much to the consternation of the slasher man, who persisted in his statement that he had followed instructions and said "them damn things are not right; I guess I know how long I boiled that size."

Mr. Greer said he believed the man was honest enough in his belief, but that he just didn't give the proper attention to his work. "We have thermometers on every kettle now," he concluded, "and we get a better and more uniform warp."

J. V. McCombs also advocated the use of recording instruments, stating that by using the charts he never has to cut a warp on account of its being soft, whereas he formerly had to cut them on this account every week. R. P. Sweeny, manager Buffalo (S. C.) Mill, talked on this subject. A. H. Cottingham, Greenville, S. C., said he is now experimenting with three different types of recording instruments.

"Do you consider the recording thermometer or the temperature regulator more important?" was the next question, asked by J. B. Harris, superintendent, Greenwood (S. C.) Cotton Mills.

Mr. Sweeny declared that he thought both were necessary. He said that the recording thermometer enabled the mill superintendent to check up on the man making the size, to see whether or not he starts up on time.

Frank G. North, Atlanta, pointed out that in regard to the efficiency of the recording instrument, it has been only a comparatively short time since these instruments have been developed and that efforts are constantly being made to eliminate all shortcomings and difficulties, and to bring them to the point where they will be thoroughly efficient.

In regard to the making of size, Mr. Iler, of Greenville, said, "Most mills start in and employ the best carders they can find, and then they get the very best spinners possible; then when they get the yarn they put it in the hands of an inefficient slasher man, who can tear down all the good work accomplished in the preceding processes. I think it would be a good plan to begin working on the slasher man, and get rid of a lot of trouble by educating the man who does the work."

H. S. Wylie, Chadwick-Hoskins Co., Charlotte, N. C., asserted that he doesn't let the size get away from him at any time. "I go through every kettle of size, and make the man fix up every kettle full right. I teach the man to make it to start with. If a man wishes to learn, I am willing to teach him, but if a man working for me does not do what I tell him, I do not hesitate to dismiss him. But if I can show a man anything, I will do it."

Mr. Williams, Greenville, stated that he had under contemplation the installing of an over-flow pipe. He said that with such an over-flow pipe, the worker can open the valve and let it drain through the pipe so as to get the right level for a proper mixture, and make a more uniform size.

The Discussion on Weaving.

Chairman Gibson then announced that the meeting would enter into a discussion of weaving questions. The first question was "What is the best speed for a 40-inch loom?" An equal number seemed to be running around 156 and 160 picks per minute, while two men indicated that their speeds are less than 156 picks per minute.

J. A. Chapman, Jr., superintendent, Inman (S. C.) Mill, declared that when he had cut the speed of some of his looms from 160 to 156 picks per minute, the production went up.

Mr. Curry, Lancaster, S. C., said, "I think it depends very largely upon the construction of the cloth being made. I have 470 looms on 80s-square. I run them at 160 picks per minute. I have 746 looms—on 68 × 72s—on which I raised the speed to 163 picks per minute. I find that we get better production with the looms running at 163 picks than on the 470 looms running on 80s-square at 160 picks. I have weavers who run 28 looms on the 80s-square, running their batteries."

"I recently started up 104 Draper looms on colored work," said N. H. Welch, overseer weaving, Florence Mills, Forest City, N. C., "at 162 picks per minute, and then cut down to 152 picks and I got better goods with less pickage."

Mr. McCombs related an incident when he was in charge of 25,000 spindles in a North Carolina mill which had some 40-inch looms running 164 picks, with a production of 75 to 80 per cent. The yarn from his room was tested, he said, and came out all right, which proved that the spinning room wasn't causing the low production. He pointed out to the superintendent, he asserted, that the looms were

being run too fast, and after the speed was cut down to 152 picks per minute, the production went up to around 95 per cent.

T. N. Crocker, superintendent Banna Mfg. Co., Goldville, S. C., stated that when he increased the speed of his 340 looms about eight picks per minute his production went up from 90 to 98 per cent. It was his opinion that looms on print goods should be run about 160 picks per minute. In reply to a question from the chairman, Mr. Crocker stated that the supplies increased with the higher speed.

In a weave room of 400 looms, said Mr. Williams, with a portion of the looms on 80s-square and a portion on 64 × 60s, he believed the most suitable average speed was around 160 picks per minute.

The Life of a Shuttle.

A question was asked by Mr. Curry relative to the number of shuttles used per loom per year. Mr. Chapman stated that he had found on 160 looms, a usage of about one shuttle in 13.3 months; these were dogwood shuttles.

Mr. Cottingham, Greenville, S. C., said that he had once run a mill on 64 × 60s where he had used about one shuttle a year. "On fancy work we used about 1½ shuttles a year per loom," he added.

"During the last twelve months," reported Mr. Wylie, Charlotte, N. C., "I have used 468 shuttles on 580 looms. I use both kinds of shuttles, first class quality, making 56s warp and 76s filling."

Further discussing the "life of a shuttle," C. P. Dill, overseer weaving, Brandon Mills, Greenville, S. C., made this statement, "We have a record of all shuttles used. We have each loom numbered and these numbers are placed in a book. When a shuttle goes out, it is charged to the loom in which it is placed, and the date is recorded. Also the weaver securing the new shuttle must bring an old one back with the date on it." This gives Mr. Dill a rather complete check on each shuttle and the time each loom uses a shuttle. "It would be surprising to the men here," remarked Mr. Dill, "if they could all find out just what looms are using their shuttles. Not all of them. Some will run a shuttle for one year, or possibly two years, while others run them for only two or three months."

It was the opinion of another of the group that the life of a shuttle depends upon the speed of the loom, and the construction of the goods. It was pointed out that a mill will use more shuttles when on high speed than on low speed looms.

"In regard to the life of a shuttle," said Mr. Hogue, Exposition Cotton Mills, Atlanta, Ga., "there are several things to consider. I have my shuttles and looms numbered, etc., and get a check on the individual looms and shuttles. I find that the life of a shuttle is between 12 and 14 months. I have run them for two years. You will find by close inspection that it is not all the looms that damage the shuttles. Also, I figure that the weave has a whole lot to do with the life of a shuttle. One thing that hurts the shuttles is bad pickers. By close adjustment of pickers you can prolong the life of a shuttle considerably. Watch the construction, keep tab on the fabrics, and keep a record of the shuttles. The life of a shuttle depends upon pickers and the construction of the weave."

Mr. Crocker, Goldsville, S. C., expressed the opinion that "it is abuse and not use of a shuttle that destroys it." Another bad feature, he pointed out, is a loom that is not properly set up. He added that 95 per cent of shuttles are destroyed by abuse. Shuttles should run for two or three or even five years, he asserted, with the proper care.

Mr. Hogue stated that he agreed with Mr. Crocker, and said he had found it a good point to put tallow in screw eyes and lubricate once a month with tallow. He censured the practice of allowing weavers to trim and whittle shuttles down with knives.

The next question brought up for discussion was, "What is the average life of a check strap?"

J. L. Wofford, Lydia Mill, Clinton, S. C., said, "We have kept a record of our check straps and find that the average life is 11 months provided the straps are put on right."

It was ascertained at this point that only five of the number present indicated that they are keeping a record of their check straps.

Mr. Crocker stated that about 8 or 10 months is a good average life for a check strap; others said 12 months, others 10 months.

It was the opinion of Mr. Greer, Ware Shoals, S. C., that the life of a check strap depends upon the loom fixer. some of these men, he indicated, use their box wrenches when they should not. He stated that if a check strap is working properly, it will not last over six or seven months. Mr. Curry agreed with Mr. Greer. Mr. Wylie, Charlotte, said he can get two inches of check on every check, and the check strap will last for 12 months. He indicated that he has 580 looms running in that manner.

The next question was that in regard to the advisability of riveting loom belts at laps. Mr. Chapman, Inman, S. C., said, "I started up 100 new looms and let the belts go in without having them riveted. They ran six months and then came loose. I sent them back to the manufacturer and he sent riveted belts and now there is no more trouble."

Mr. Howard, of Whitmire, S. C., related a similar experience. He stated that after the belts had been riveted he experienced no further trouble.

Mr. McCombs, Buffalo, S. C., advocated the cemented belt. He spoke of a belt of this type which could be boiled for two hours without injury.

Mr. Crocker, Goldville, S. C., stated that he has never found a belt that is absolutely waterproof. He said he "once had the misfortune to work in a mill which had 1,268 looms equipped with waterproof belts." "This mill had been running 10 years," he continued, "and one day I counted 27 buckles on a little loom belt 28 feet long; I found about the same condition in every room. Finally we changed superintendents and the new one had all the belts riveted and after that we had no more trouble."

Mr. Boyd said he had run waterproof belt through water outside the weave room, but when he put the same belt in the weave room where the humidity was great, the waterproof cemented belt will not work.

J. B. Harris, Greenwood, S. C., asked the question, "What is the width of belt most commonly used?" Practically every one present indicated the use of a 2-inch belt on 40-inch Draper looms. Mr. Harris said he is using a 2¼-inch belt because "we get more uniform speed with lessened supplies." "We have made no elaborate tests," he replied to a question, "but have made enough to substantiate that claim."

The Luncheon.

At 1 o'clock the mill men laid aside, for a time, the ram-

ifications of the weave room, and gathered around the festal board at the Imperial Hotel for a Weaver's Luncheon. It was a Weaver's Luncheon in almost every respect. The resourceful Greenville entertainment committee had arranged an appropriate menu, showing a reproduction of a loom, and a souvenir shuttle was placed at each cover by a local firm to add more "weaving color" to the affair. During the luncheon, the mill men were delightfully entertained with vocal selections by three young ladies from the Greenville Woman's College, Misses Eleanor Keese, Flora Bennett and Maribel Waters. Roy Hoffmeister, a Community Service song leader, led in group singing of several familiar songs. The Whitmire (S. C.) Band, which was in the city for the Southern Textile Athletic Association tournament, also contributed several selections to the musical portion of the program.

Major W. F. Robertson, Federal Prohibition Commissioner for South Carolina, acted as toastmaster, and also gave an impressive reading of the "Tapestry Weaver."

Two Greenville blackface comedians put on a burnt cork specialty which elicited much applause from the diners.

A feature of the occasion was a brief address by Capt. William G. Sirrine, president of the Southern Textile Exposition, Inc., who outlined the plans of that organization for the Textile Products Show which will be held at Textile Hall, Greenville, next October. A detailed announcement of this exposition appears in a story upon another page of this issue. Capt. Sirrine also expressed his appreciation to the members of the Southern Textile Association for their assistance in making each of the four Southern Textile Expositions better than its predecessor, and asked for their cooperation in connection with the show which will be conducted next fall.

After the luncheon, the mill men returned to Cleveland Hall for

The Afternoon Session

which was opened shortly after 3 o'clock by Chairman Gibson with a talk of encouragement to the men, and a plea for their assistance in the discussion of the afternoon.

The chairman first asked for a discussion of conditioning systems. W. P. Teal, overseer weaving, Oconee Mills, Westminster, S. C., said that his mill has a conditioning system which makes the yarn stronger and prevents its kinking. He said that they weigh their yarn before using the conditioning machine. His warps are 30s; and his filling 20s to 45s. They condition the filling yarn only, he stated, and their twist is a little above standard.

Mr. Franks, Watts Mill, Laurens, S. C., explained their conditioning system fully. He said that they have a room built out from the mill for the purpose. They must condition the filling, he pointed out, to keep it from kinking. He explained that by his method, he avoids rust and black oil on the filling.

C. A. Mattison, overseer weaving, Courtenay Mfg. Co., Newry, S. C., said that with their conditioning system, he is not bothered with stringy selvages, kinking and looping in.

The question was asked whether in conditioning the enameled or shellacked quill was used. One of the men uses shellac while another uses the enamel.

One weaver stated that in the use of the shellacked quill, there was trouble with the yarn sticking to the quill. It was advised that in the use of shellacked quill, it should not be steamed too much; if too heavy a steaming is applied, it will loosen the shellac.

The chairman asked how many present were running their looms with friction clutch. Several indicated they were. One man said he runs 700 Draper looms with cork inserts and gets great satisfaction. This is with positive motor drive.

Mr. Franks said he has 1,000 looms with friction clutch and has no trouble.

Mr. Wilson said that he has some looms which fail to keep up to the proper pick, and vary from 148 to 156 picks per minute when they should run 160, while on others he has no trouble in getting 160 picks per minute. This is with cork inserts. It was suggested by Mr. McCombs that Mr. Wilson substitute rubber inserts.

"We have had some little trouble with the frictions slipping," said Mr. Franks, "but I always have my frictions cleaned with gasoline, about once every six months. The best way to avoid slippage is to have a certain time to clean all the looms. I now have no trouble with frictions slipping."

Mr. Wilson asked what experiences the men present had had with the Hopedale attachment. Mr. Franks stated that he had 1,000 of these attachments, and, in reply to a question, he asserted that the fixers can keep up just as many looms. Mr. Howard also uses the attachments and said fixers can keep up the same number of looms.

Mr. Chandler asked how many looms the fixers could take care of, and Mr. Howard replied that his could care for 96; Mr. Wilson indicated 80, on bag goods; and Mr. McCombs said 80 looms on 18½s.

Mr. Gibson then asked, "What is the most economical way to overcome a worn shaft and bearings?" and it seemed to be the consensus of opinion that the only way—or at least the best way—is to replace the worn ones with new.

The meeting then entered into a discussion of the merits of several types of bearings. Among those taking part in this discussion were Chairman Gibson, Z. Y. Mode, W. B. Williams, D. W. League, L. T. Curry, L. O. Bunton, and C. H. Warren of the Draper Corporation.

Chairman Gibson next asked how many had pick counters on their looms and none present indicated that he had, with the exception of Mr. Hogue, Exposition Cotton Mills, Atlanta, who said that he did not approve of them inasmuch as it was too easy to tamper with them and "fake" them.

Mr. Sweeny said that when his mill was on night work during the war he had installed some pick counters on his looms which gave very good results. He said that these counters were tamper-proof and were geared to the sand roll. He added, however, that when his mill took off the night line he had no further use for the counters and took them off.

Mr. Gibson asked the question "What is the temperature and relative humidity best suited for good running work?" Eight indicated that they are using 80 degrees temperature; four reported 70 degrees and one 60 degrees. The consensus of opinion seemed inclined toward about 80 degrees.

D. W. League, overseer weaving, F. W. Poe Mfg. Co., Greenville, S. C., says it depends upon the construction and numbers as to the degrees of heat. On 80s-square with ¾-inch staple it is necessary to run 80 degrees, he asserted, but with 1-inch staple the temperature can be

dropped. But it is altogether governed by the kind of work, he stated. With a heavy pick it is necessary to watch the humidity very closely and have it warmer to make the goods run better. He stated that he carries a humidity of 71 to 72 on the wet side and 74 to 75 on the dry side.

Mr. Curry said he takes tests of his humidity and finds that he has less looms stopped when the temperature is around 78 degrees. He has records for six months back, he declared, which bear him out on this.

Frank Bell, Jr., Parks-Cramer Co., said, "In our estimation the proper humidity to carry in a room depends upon local conditions and just what you want. There are two things necessary in humidifying a room: the temperature and the percentage of moisture. You also want to retain what we term regain. You will find that about 8½ per cent is what you want in a weave room. If you are running 160 or so picks per minute you must have a comparatively high temperature and a relatively high degree of humidity to retain the proper regain. We recommend in the weave room a temperature of around 70 or 75 degrees with a relative humidity of about the same."

The chairman asked if anyone had tried centrifugal pumps for humidifying systems, and L. O. Bunton, superintendent, Belbro Mills, Charlotte, N. C., stated that he had tried them in a mill several years ago but had found them unsatisfactory. They make too much moisture around the openings, he declared, and give an uneven distribution.

Mr. Gibson pointed out that weavers appreciate a good pressure of humidity. He said they have the centrifugal pumps at his mill and find them very satisfactory. They have a pressure of about 200 pounds at the pumps, and have reducing valves on the line so they can have any pressure they desire. Mr. Gibson said they try to keep a pressure of at least 120 pounds at the last head. It is for the interest of the weavers, he declared, to have good humidification.

The discussion of humidification was taken up further by M. T. Grimes, superintendent, Gluck Mill, Anderson, S. C., Mr. Wylie, of Charlotte, and others. Mr. Wylie advocated stopping the humidifiers off 30 or 40 minutes before stopping time, so that the drop wires, etc., will dry out, and said that he doesn't have any rusty drop wires He said that he runs a humidity on the wet side of 68 and on the dry side of 70 degrees, on 56s warp and 76s filling.

Replying to a question as to how much tallow he uses in his sizing compound, Mr. Williams, American Spinning Co., said he uses 10 per cent pure beef tallow, and keeps his room at a temperature of 75 degrees, and he doesn't keep a relatively high degree of humidity.

The chairman then asked for discussion on the question, Which is the better lubricant for looms, regardless of brand, fluid or non-fluid oil? A number indicated that they use non-fluid oil for the purpose.

Mr. Franks stated that he changed from fluid to non-fluid because the fluid oil would spatter out all over the goods. The non-fluid oil, he asserted, has body and will not spatter.

Mr. Brannon, Union-Buffalo Mills, said that he has had experience on both kinds and considers one application of non-fluid oil equivalent to two applications of fluid oil. The fluid oil will spatter, he supplemented, and make seconds.

"Which is the more economical, a new cam or a cam patch?", was the next question asked by the chairman. The majority of those present seemed to favor the cam patch. J. H. Huff, superintendent, Camperdown Mills, Greenville, S. C., stated that if patches are put on right they take the place of a new cam.

The chairman next asked, "How many are using compressed air for cleaning looms?" Several indicated that they were. Mr. Wylie, of Charlotte, said he uses compressed air because it is cheaper and does not cause seconds.

The final question was "What results have been obtained from individual motor drive?" and several took part in the discussion of this subject, which was favorable to the individual drive system. No one brought out any objections to it.

This brought the technical discussion to a close, and the meeting adjourned, after admonitions on the part of the chairman and President Boyd to the men to lend their cooperation to the chairman in working out the questionnaires which will be presented at the annual meeting of the Southern Textile Association, which will be held in Atlanta, Ga., on May 13 and 14.

Southern Textile Basketball Tournament.

The first basketball tournament of the Southern Textile Athletic Association was held in Textile Hall, Greenville, S. C., on Friday and Saturday, February 25 and 26, and was a live affair from start to finish and a great success from every standpoint.

Thirty-two teams representing mills of four southern states participated in the tournament. There were 28 games played on the courts at Textile Hall, and in the finals, played on Saturday evening, the Woodside team, of Greenville, won the championship of Class A of the tournament by defeating the Schoolfield (Va.) quintet by a score of 26 to 15. The Class B championship was acquired by the Monaghan Scouts, also from a Greenville mill, when they defeated the team from the Apalache Mills, of Greer, S. C. In the girls' division, the two teams from the Monaghan Mills were the only ones remaining when the finals were reached, and Monaghan "A" team copped the honors by defeating Monaghan "B" by a 47 to 15 score.

On Friday evening at 6 o'clock, the first annual banquet of the Southern Textile Athletic Association was held in Textile Hall, and this was attended by 375 participants in and visitors to the basketball tournament. Because of the coincidence of the two occasions, quite a number of mill men who were in Greenville attending the Weaver's Meeting held earlier in the day were guests at this banquet, complimentary tickets having been distributed through the courtesy of the Young Men's Business League.

Several natural conclusions were to be drawn by a visitor at this banquet and to the games of the tournament: The mills are interested in the welfare of the young people of their villages; these young people, taking advantage of the evidence of this interest, have developed a belief in and an adherence to clean, wholesome sport, a desire to play the game in fair, yet keen, competition, with the best of fellowship prevailing; these boys and girls undoubtedly apply these principles to the game of life, by the creation of higher standards of living.

The banquet started off with a vim characteristic of the whole tournament. The excellent mill band from Whitmire, S. C., swung into music of a popular vein while the seats were being filled, and when all were in place, the

band struck up "America" and the hall was filled with echoes of the song as everyone present joined in the singing. After the diners were seated, the band reverted to popular music and a flock of vari-colored balloons was turned loose on the heads of the guests. Waving Japanese parasols suspended from the ceiling added to the gaiety of the occasion.

The meal, which was an excellent one, was interspersed with vociferous cheers from different sections of the hall, given by the loyal supporters of the various teams. The writer was seated across a table from the feminine contingent from the Judson Mills, and is here to say that these young ladies certainly possess health and pulchritude in abundance. This was true also of each group of players who were seated in different parts of the hall, vieing in lusty cheers and yells for their teams. And it was evident that the young men, too, are taking advantage of every opportunity to improve themselves. No material for an "uplifter" in that crowd!

W. M. Grier, of the Woodside Mill, served as toastmaster at the banquet, and called on W. B. Gordon, G. N. Douglas, Milton G. Smith, A. H. Cottingham, Miss Marjorie Potwine, and F. R. Corwin, for ninety-second talks, and Moss E. Penn, equipped as a traffic cop with a whistle and "go and stop" sign, saw that the speakers kept within the time limit.

W. V. Martin, of Spartanburg, president of the Southern Textile Athletic Association, told of his pleasure over the success of the tournament. He expressed the hope that the Southern Textile Athletic Association will be the means of eliminating from textile village sports the element of professionalism.

In a similar vein, Prof. Hugh T. Shockley, of Spartanburg, commended the sportsmanship of the players in the tournament, and urged every member to remember always that a game played fairly and lost is more of a victory than one played unfairly and unsportmanlike in order to be the side securing the higher score.

Following these brief talks, a set of resolutions opposing professionalism in cotton mill sports was unanimously adopted. The resolutions expressed approval of strictly amateur standards in all sports between mill village teams, and placed the association on record as favoring the elimination of all professionalism and semi-professionalism in the conduct of such contests. Clean sport, first and last, and each and every player on a cotton mill amateur league strictly an amateur player was the keynote of the resolutions.

On Saturday morning a parade was held on the main streets of Greenville in which team members, both boys and girls, and numbers of visitors participated.

It was the decision of the officials of the association that an enlarged tournament shall be held next year in Textile Hall. This action was taken at the afternoon business session on Saturday. The executive committee of the association was instructed to invite representatives from industrial communities in the South to meet at some early date to discuss the proposal that standard amateur baseball leagues be organized in mill villages throughout the southern section.

H. A. Metz & Co., Inc. have recently donated a complete dye laboratory to the New York Textile School, spending several thousand dollars on the equipment.

The Gassing of Cotton Yarns.

BY RAFFAELE SANSONE.

In the manufacture of every kind of cotton yarn, especially for mercerizing, to be sold and used as such or to be transformed later into fabric, a most important operation to which the material is subjected is the elimination of the projecting fibers by gassing or singeing.

This operation has undergone much improvement during the last 30 years, and is now conducted very economically and advantageously on special apparatus of varied construction, with which the long and tedious work of other days has been transformed into one of little time and great effect.

In the production of many articles gassing is of first importance. If this process is not conducted with the necessary care, it will be impossible to produce a satisfactory finish or polish on the ultimate product, even if the raw material is of the very best quality, for the surface will be irregular, owing to the presence of fibers that cover it at close intervals, producing shadowy and projecting portions upon it.

The gassing of cotton yarn is sometimes carried out by the spinner and sometimes by the finisher. If it were employed for giving a more perfect regularity to the surface of the yarn, before submitting this to the final finishing operations, a certain number of projecting fibers formed on the surface of the yarn could be eliminated, not reducing in any way the value or appearance of the yarn. By treating the yarn before the gassing by any of the processes of boiling out, bleaching, mercerizing, dyeing or printing, aids in maintaining in it nearly all the material originally employed during the spinning and secures the highest possible shine, as well as a higher yield or weight of material.

With a similar point in view one could submit the yarn to the processes of boiling out, mercerizing, dyeing, bleaching or printing, before it has been gassed, subjecting it to gassing before the final finishing operations and after it has been dried. By doing this a good portion of the fibers that are lost at the present time in the gassing process would disappear into the interior of the yarn being treated, thus rendering the yarn more complete. A much lower number of the fibers would be removed in comparison with those removed where the process is conducted immediately after the spinning.

For the reasons given and for other reasons, the introduction of the gassing process in the finishing works would offer its advantages. It must not be forgotten, however, that besides the gassing frame, an apparatus for unwinding the yarn from the skeins to the bobbins for the work of the gassing frames would be required in the majority of cases. However, if the mercerizing process is eliminated from the treatment of the yarn, and it is dyed in the form of cops, or on special bobbins having a perforated center, this expensive second apparatus would be avoided altogether.

If the processes previous to gassing are conducted with the proper care, a well constructed gassing apparatus does not require much attention on the part of the operatives, because every operation is automatic. It is only necessary to watch the entrance and exit of the threads, the good

functioning of the small burning flames, and the regular functioning of every part of the machinery, avoiding the collection of fibers, dust or other extraneous matter. All this can easily be attended to by any intelligent worker.

The working principle of the greater portion of gassing frames is not very difficult to understand. In one of the simpler forms, the cotton threads, coming from the two rows of bobbins or cops on iron or wooden spools fitted on a vertical wooden frame, are passed rapidly through thread guides of glass or other material. This brings the threads on different small wheels, that are grooved on their round portion. Two series of these wheels keep each single thread crossed in such a manner as to expose it twice to the action of one of the small flames produced by a row of burners fixed on a single tube. Other wheels serve for introducing and carrying the threads to and from the apparatus.

On coming from the exposal wheels the yarn is passed on to the bobbins that are moved by the friction of small cylinders. The gas burners are of special construction and utilize a mixture of ordinary coal gas and air. The construction of these burners is also varied in accordance with the character of the gas at disposal. When intensified or high tension gas is used special burners are employed.

Another characteristic that distinguishes many gassing frames is the hood. This is fixed just above the point where the warm combustion gases are produced by the action of the small flames on the projecting fibers. Through the burning of the gas itself, these gases are absorbed very rapidly, avoiding to a great extent their entrance in the air around the apparatus, and their consequent effect on the workers. This hood is often surmounted by a large steel ventilator.

A good gassing frame should treat 20,000 inches of cotton thread per minute. In the case of fine goods, however, the speed should not be above 5,000 inches per minute. It is necessary to regulate the speed in accordance with the quality, twist and number of the yarn being treated, or in accordance with the numbers of fibers projecting on its surface.

The gas consumption in the greater part of gassing frames is not very great, and varies more or less in accordance with the rapidity with which the material is treated. It is advisable, however, to effect any changes in the frames which will allow a still further reduction in gas consumption.

It would be an improvement to completely dry the material before its contact with the small flames of the gassing frames, thus avoiding all unnecessary losses of heat that take place through the evaporation of water, or because of the resistance of moist fibers to combustion.

For accomplishing the drying the yarn could be first introduced into an oven of convenient construction, heated by exhaust steam, direct fire or through the heat transmitted by other drying operations, such as cloth drying, yarn drying, etc. Here it would be left until a constant weight was reached.

By adopting some special arrangement on the gassing frames whereby the threads of cotton yarn pass in the warming zone of the small flames and not allowing the former to come in contact with the burning portion of the flames until they are completely dry, it would be possible to avoid altogether the drying process in the oven, greatly simplifying the work for the operatives.

For this purpose three double series of wheels could be employed, being placed immediately above the small gas flames in such a manner that each flame has action under every sixth wheel. In this manner the cotton threads would enter in a crossed condition, and pass twice across the flames as in the preceding apparatus, entering first on the highest double series, and passing on to the next double series and finally on the last or lowest double series, where they would come for the first time in direct contact with the flames, later making their exit from the frame to be wound on bobbins which would be turned as usual through the friction of small wheels.

For avoiding the possibility of the material catching fire during its treatment, because of its great dryness, it could be pressed before winding on the bobbins, by a series of small pressing rollers that would take every thread at its exit from the flames and extinguish any burning fibers.

The wheels for the exposal to the flames, and those for the drying, would be turned automatically in such a manner that the cotton threads would have no effort to make, being transported through the apparatus with the greatest ease. The speed adopted for the passage of the threads would be eight to ten times that employed on an ordinary gassing apparatus, for avoiding the long or strong contact with the flames, which would cause a blackening or combustion of the dry threads.

The burners for this apparatus must be of special construction, and so arranged as to produce the small flames where they are required of exactly the desired size, and without the danger of this increasing or decreasing. Burners producing flames of just sufficient size for reaching the material are to be preferred.

With the present conditions of the gas and the continued danger of the size of the flames on the frames diminishing at any time, it would be of advantage to add to the frames a small regulating gas container which would be filled in the moments of maximum pressure in the works supply, being employed exclusively to maintain pressure when this supply is low, or for avoiding useless complication, the gas contained in the gas container could be adopted as the only combustion means.

If it is not wished to adopt such a method, a simpler means of avoiding inconvenience could be adopted, based on the use of a mechanism regulating the entrance of the gas through a tap that is opened less when the pressure is very strong, and more or completely with the reduction of the pressure.

The reduction in the cost of the gassing brought about by such an arrangement would be considerable and would require very little change on the ordinary frames.

When coal gas is not available, or can be obtained only at prohibitive prices, the gassing frame is sometimes supplied with a small separate plant for the transformation of substances such as petroleum, benzoline, benzine or gasoline into the form of gas, which is then employed in the place of the first for the supply of the small flames.

Such a plant would not be very complicated, and it is already employed in mills located in isolated spots, where coal gas is not employed for illumination or for any other purpose. It consists principally of a cylindrical vessel of tinned or galvanized iron divided in two separate portions. In the upper portion, the gasoline or other volatile

product is entered through a copper funnel supplied with a tap, while in its lower portion is conducted the transformation from the liquid to the gas form. The upper portion also contains a distribution tube, supplied with a tap for the delivery of the gas, a thermometer, and a safety valve; while the lower portion is supplied with a copper coil for warming with steam, and with a tap for the introduction of all air required for regulating the combustion.

As the apparatus is not soldered between its upper and lower portion, and there is a double border bolted down all around, the inside can be cleaned whenever required. This is of great advantage, as it avoids all trouble created through the formation of deposits. The generation of the gas does not produce bad odors, and is not dangerous for the reason that no fire is employed and with ordinary care no explosive mixtures are produced.

This apparatus is usually employed as follows: the gasoline or other volatile liquid is entered through the funnel in the upper part of the apparatus, after having opened the tap. When all the liquid has been introduced, the tap is closed, and the steam opened in the coil until a certain temperature has been reached, special care being taken, after this, to close the tap in such a manner as to keep the temperature constant. At this point a regulated stream of air is caused to circulate through the apparatus that transports the gas with it, causing this to escape through the tube and tap already indicated, for transportation to the gassing frame. The speed at which the air is entered in this instance in the apparatus is regulated with care so as not to dilute the combustible gas produced too strongly.

The gasoline to be recommended for this purpose is that having a specific gravity from 0.640 to 0.660.

The gassing process is still a very good field for exploitation, not only for the manufacturer of white or colored cotton goods, but also for the technical expert, with the probability of bringing further beneficial transformations. There is also the probability of introducing other combustible dispositions or special gases that can quicken the process and render still more economical work, thus permitting the enterprising manufacturer to surpass him who sleeps on the success and enterprise of past generations, and is contented to continue the treatment of his goods in the same way.

Among the possible future innovations may be mentioned the following:

1. Gassing through the use of nascent hydrogen brought to its maximum calorific potentiality.

2. Gassing through the use of surfaces rendered incandescent by the passage of an electric current of convenient intensity.

3. Gassing on the self-acting mules simultaneously with the twisting operation.

In gassing with nascent hydrogen it would be necessary to adopt a special type of burner, and a small plant for the generation and distribution of the gaseous combustible mixture. The burner would differ very much from those usually employed. It could be of round form, with a central hole, through which could pass a regulated stream of oxygen and air, or simply a stream of oxygen, in accordance with requirements. Around this perforation would be placed a series of much smaller holes, through which nascent hydrogen could pass in such a manner as to form a circular flame of little height, but of very great intensity or potentiality having the advantage of receiving the greatest combustion strength from the center and of eliminating the carbonic acid formed on its outer portion. A similar type of burner would be screwed on in the same place as the usual gassing burner. The greatest combustible force of the small flame produced in this case would, however, require the adoption of a much greater speed in the passage of the cotton threads than in the ordinary gassing apparatus, in order to avoid the danger of a blackening or burning, which could take place very easily.

With such an arrangement, drying and burning wheels, as already described, could be employed for quickening the treatment of the goods still further, and bringing about more economy.

The small plant required for the generation and distribution of the combustible gas in this instance could consist simply of a closed copper reservoir of cylindrical shape, in the upper portion of which hydrogen is introduced by causing dilute sulphuric acid to react on zinc or iron turnings. The oxygen would be taken from the usual tubes already so largely employed for other purposes. Having the possibility, an electrolytic plant generating both hydrogen and oxygen could be adopted to greater advantage, to which modifications have been introduced tending principally to reduce the production and to collect the gases formed under the most economical and convenient form.

The electrical gassing process would be conducted through the use of conductors that are rendered incandescent by the passage of a high tension electric current, and on the outer surface of which each thread of cotton passes rapidly twice, exposing the projecting fibers to its immediate action, and not allowing the combustion of the fibrous matter, because of the speed adopted. In a similar case a single conductor could be adopted of the same width as the space occupied by the cotton threads, reducing its section as much as possible to avoid a useless resistance to the electric current, or several smaller conductors could be adopted of just sufficient size for bringing about the combustion of 5 or 10 threads at a time, and reducing the resistance offered to the electric current, and consequently the price of the treatment. In those sections where water power is available in abundance and electricity can be produced cheaply, such an apparatus would certainly be of great advantage.

With the general tendency of modern times to simplify every operation of treatment, concentrating these together as much as possible, to reduce the price of the finished article and bring it before the public in a more perfect condition, another step forward in the gassing of cotton yarns is foreseen, and this is the adoption of plants at certain points that conduct simultaneously the twisting and gassing of the cotton yarn. This is for avoiding the intermediate windings of the yarn on bobbins, and the consequent rubbing that follows, which often causes a quantity of projecting fibers. Such equipment requires but little addition to the spinning plant and brings a very great economy in comparison with the separate method of twisting and gassing.

The Demands of Color Fastness on Cotton.

BY A. BURTON.

The fastness of colors is dependent upon certain destructive actions arising from causes which exert themselves in different manners. An absolutely fast color does not exist, so that the term fast is only to be used in a comparatively limited sense in regard to the degree with which the colors withstand these influences. We speak of fastness to light and atmosphere, to washing and milling, to rubbing and perspiration, to bleaching, to acids and to the alkalies.

The dyer should be certain which of these tests are required of him before the selection of a dye, nay, should demand this information, else his reputation falls shattered to the ground and he is condemned in the eye of the public, and then we are told fast colors cannot be dyed at home. Let the ambition of a colorist be a reputation for quality; cheapness should be relegated to the man who goes for quantity only.

The production of uniform goods which have to withstand the action of light, air, and oftentimes rain, for the most part of a day, demand a different test for fastness than, say, an expensive silk which perhaps never is exposed to the rays of the sun, but only shows forth its beauty under the benign influences of artificial light, and perhaps is worn very seldom. In the production of carpets and curtains the fastness to light must be the leading test, while for knitted goods the choice of a color should depend upon its fastness to washing.

The researches of Chevreul have proved that even the same dyestuff has not the same fastness on all fibers. For instance, indigo extract is the fastest when dyed on silk and the most fugitive on cotton. Vat indigo blue is the fastest on wool and the least so on silk, whilst madder is the fastest on cotton. Therefore, because a dye is fast on one fiber, it is no criterion that it will be equally so on another. It is also phenomenal that saturated dark shades are faster towards light than the same dyestuff dyed in lighter or unsaturated tones. For example, take the superior alizarine colors which have proved to be the most unsuitable for fast light mode shades. It is also known that some dyestuffs, such as alizarine, madder and cochineal, give with all mordants fast colors, whereas young fustic produces stable colors with some mordants and fugitive ones with others.

With regard to the artificial dyestuffs they may be arranged in groups conforming to their chemical constitution, and one may safely be sure that in accordance with the arrangement of the atoms within the molecule these groups will be productive of fast or loose colors, showing that chemical constitution seems to play a large part in determining the value of a dye, and most dyestuffs produced from a base such as aniline are mostly fugitive, whereas alizarine and its derivatives are mostly fast.

The united action of light and atmosphere subdue every color; some few only after a long lapse of time, noticeable by the gradual fading of the color. Indigo, world famed for fastness, gradually darkens during the first year, then gradually fades away, and it seems a truism that as the sun gives us our beauteous colors, so does it take them away. The dyer possesses no means of strengthening the fastness to light and air, except in the case of a few isolated colors, and yet the color must be more or less fast, especially in such goods as hosiery, underwear, corset covering, linings, etc., and in a much stronger degree in dress goods, awnings, etc. The only way of escape is the proper choice of the dyestuff, and to achieve this end the dyer must have recourse to an exposure test, made somewhat after the following manner:

A dyed sample is half covered with a thick removable paper covering and exposed to the light in the open air, being hung up in a locality where it shall receive the rays of the sun, but at the same time be protected from the weather. At specified times the paper is gradually pulled over the exposed portion, say, half-an-inch at a time, until the last half-inch is reached, when the gradual fading of the color may be seen at a glance by the removal of the covering and the time noted. For a standard the result may be compared with a sample dyed with indigo blue or turkey red. The samples are observed daily and the day noted when the first change in color is noticeable. In summer it takes usually twelve to fifteen days for indigo blue, and twenty-five to thirty for turkey red. In winter about double this time is necessary.

Considerable practice is required in noting the first change which takes place in the color, and it is only after repeated trials that one becomes expert in distinguishing the characteristic changes which take place with the different colors. Thus the fading indigo blue retains its original dull tone, whereas the bright methylene blue becomes duller, then paler. The fading action is, therefore, more discernible in the latter than in the former, and readily gives one the opinion that indigo blue is faster to light than methylene blue.

Probably the most important, at all events of paramount importance, is fastness to washing. How often is a muslin or gingham condemned after it has made its reappearance from the laundry? No longer to be recognized as it once was, the joy of its wearer, though the salesman assured the fair purchaser that it would wash. To meet this requirement the color must withstand both a mechanical friction as well as the action of an alkaline solution under various high temperatures. Under these conditions the color may not even change its tone, but may bleed and stain other colors woven or printed alongside, especially in the case of white. Such a color alongside would not be considered fast to washing.

Absolute fastness is only shown approximately by a few dyestuffs, such, for example, as aniline black by the oxidation process. Any deleterious action in washing is due to the free alkali in the soaps used. Neutral soaps, even the ordinary tallow soaps, are not generally of much danger, but often the common household laundry soap is a yellow variety (itself a fast color) containing in a large measure free alkali. Ultimately the last portions of the mordant are destroyed, which is the means of binding together fiber and color, thus freeing the fiber of its color. Therefore stronger mordants should be used so that the free alkali present shall have a superfluity of mordant to counteract it, and also dyestuffs should be chosen, the lakes of which have a greater resistance towards alkalies.

(*Continued on page* 469.)

Soap

BY WILLIAM B. NANSON.

Curd, Grain or Settled Soap.

This variety is manufactured by boiling the fat with alkali and removing the unused lye which is afterward worked over to extract the glycerin.

In soap making by hot processes either natural oils and fats or fatty acids derived from them are used, and this process of soap making by boiling glycerides with caustic soda solutions is used on the most extensive scale and is practically the only process which yields soaps of uniformly good quality, color and hardness, and at the same time the largest amount of glycerin obtainable from the raw material by means of comparatively simple operations.

The oil mixture used differs in the several manufacturing countries and the commercial name of the product is correspondingly varied. In Germany tallow is the principal fat; in France olive oil occupies the first place and the product is known as Marseilles or Castile soap; and in England tallow and palm oil are largely used. But in all countries a mixture of several oils enters into the composition of curd soaps and the proportions used have no fixity. For each ton of soap made, 12 to 16 hundred pounds of oil or fats are required. In this process the oils or fats are introduced into a cylindrical or square iron vessel i. e., "soap kettle," or "copper" and churned up and melted by means of live steam. As soon as the tallow is melted a dilute solution of caustic soda is run in, in a thin stream, which assists the emulsification of the fat and includes rapid hydrolysis.

It is necessary to commence with a dilute solution of caustic soda, because, in the case of oils and fats, with the exception of the oils belonging to the cocoanut oil group and of castor oil, a strong solution of caustic "cuts" the soap paste, in the same way that a salt solution would.

As the lye becomes absorbed, a condition indicated by the taste of the product, additional quantities of lye of additional strength are added. After some time the contents of the pan begin to clear and become in the end quite transparent. The mass in the soap pan at this stage consists of a mixture of soda salts of the fatty acids with water, in which the glycerin formed in the course of the hydrolysis and the excess of caustic soda are dissolved. Lye still continues to be poured in until a sample tastes distinctly alkaline—a test which indicates that the whole of the fatty acids have been taken up by and combined with the alkali. Then without further addition of alkali the boiling is continued for a few minutes, when the soap is ready for "salting out" or "graining" as it is sometimes called.

It is necessary to employ an excess of caustic alkali to obtain a complete saponification. Experience has shown that by using the theoretically required quantity of caustic soda an equilibrium is established between soap and unsaponified fat so that the resulting mass contains such notable quantities of unsaponified fat that the soap would be worthless.

In order to convert the soap paste into commercial soap, it is necessary to separate the soda salts of the fatty acids from the excess of caustic soda and of water by adding salt whereby the soda soaps are thrown out of solution and rise to the top of the mass. Either common salt or strong brine in measured quantity is added to the charge, and the soap being insoluble in such salt solution a separation of constituents takes place; the soap collects on the surface in an open granular condition and the spent lye sinks to the bottom after it has been left for a short time to settle. On allowing it to stand, two layers are obtained—a lower aqueous layer, containing salt, glycerin and excess of caustic soda, and an upper layer containing a curdy mass of soap granules, retaining about 30 to 35 per cent of water. The lower layer is drawn off and worked up for the recovery of the glycerin.

Now if a pure soap is required, after the lower layer of spent lye is run off, the steam is again turned on and clean water or a weak lye is run in and the contents boiled until the whole is thin, close and clear. The soap is again salted out from this, and the underlye from this carries with it all the remaining discolorations and impurities which may have been in the materials or which arise from contact with the boiler.

Such a washing process may have to be repeated several times if dirty materials have been used. The spent lye of the washing having been drained off, the soap is now boiled for strength. Steam is turned on, and the mass being brought to a clear solution with weak lye or water, strong lye is added and the boiling continued with close steam until the lye attains such a degree of concentration that the soap is no longer soluble in it and it will separate from the caustic lye as from a common salt solution. The contents of the pan are once more allowed to cool and settle, and the soap as now formed constitutes a pure curd soap, carrying with it some proportion of uncombined alkali, but containing the minimum amount of water. It may be skimmed off the underlye and placed direct in the frames for solidification, but that is a practice seldom followed, the addition of rosin soap in the pan and the subsequent "crutching in" of silicate of soda and adulterant mixings being features common to soap manufacture at this stage. The spent lye from this "strengthening boil" contains much strong alkali and is therefore utilized for other boilings.

The art of the soap maker consists in so "fitting," i. e., finishing, the soap that it contains just the proper amount of water (which we will call the water of constitution) and is still "open" enough to allow the intermingled aqueous solution, as also the impurities, to settle out.

Pure commercial soaps made by the process described contain practically 30 per cent of water and no more than 63 to 64 per cent of fatty acids. Such a soap is called "genuine soap."

The theoretical composition of a genuine soap made from neutral glycerides having the mean molecular weight of about 800 (tallow, olive oil, etc.) is as follows:

Fatty anhydrides	61.60 per cent
Combined sodium oxide Na_2O	7.18 per cent
Water, including small quantities of inorganic salts and glycerin	31.22 per cent
	100.00 per cent

It is generally conceded that a commercial soap containing a higher percentage of fatty materials or a lower

percentage of water cannot be made in a soap kettle.

Glycerin.

The lyes obtained in the soap making process by boiling oils and fats in an open pan with caustic soda contain practically all the glycerin which the natural oils and fats are capable of yielding. According to the manner in which the changes are worked up in making the soap the spent lyes contain from 5 to 8 per cent of pure glycerin. In addition to glycerin the spent lyes hold in solution the common salt used in cutting the soap, and also small amounts of free caustic soda, sodium carbonate, soap and organic impurities. The less free caustic soda, carbonate and organic impurities the lyes contain, the more readily can the process of recovery and purification of the glycerin be carried on. If impure caustic soda lyes have been used, the spent lyes contain in addition to the substances enumerated, sulphocyanides, sulphides, hyposulphites, cyanides, and ferro-cyanides. The exact treatment of these lyes in a soap works depends on the state of purity in which they may be, and has, as its object, the removal or destruction of the albuminous, resinous and soapy matters in the lyes. This is done by various additions, such as lime or hydrochloric acid, or salts of aluminum or iron, which precipitate the foreign substances so that they can be filtered off, whereupon the purified lyes are neutralized and become ready for concentration.

In the van Ruymbeke process the spent lyes are allowed to settle, and then are treated with persulphate of iron, the exact composition of which is a trade secret, but it is possibly a mixture of ferric and ferrous sulphates. Ferric hydrate, iron soaps and all insoluble impurities are precipitated. The liquor is filter pressed and any excess of iron in the filtrate is precipitated by the careful addition of caustic soda and then removed. The liquid is then evaporated under a vacuum of 27 to 28 inches of mercury and when of specific gravity 1.295 (corresponding to 80 per cent of glycerin) it is distilled in a current of superheated steam, under a vacuum of 27 to 28 inches.

In the Glatz process the lye is treated with a little milk of lime, the liquid is then neutralized with hydrochloric acid and the liquid filtered. Evaporation as described and subsequent distillation under a high vacuum gives crude glycerin. This impure glycerin is again purified by redistillation in superheated steam and evaporation in vacuum pans. It must be remembered that glycerin cannot be distilled by itself under an ordinary pressure without becoming decomposed, but it can be readily volatilized in a current of superheated steam.

Soap from Fatty Acids.

This process of soap making has been in practical use ever since the stearine candle industry was established. The manufacture of soap from oleic acid—the by-product of the stearine candle industry—affording a natural outlet for this by-product. Since fatty acids are capable of expelling carbonic acid from sodium carbonate when boiled in aqueous solution, soap can also be made by boiling fatty acids with sodium carbonate. The initial manufacturing operation is, therefore, practically the same as neutralizing the fatty acids with caustic soda or with sodium carbonate as the case may be. The precaution must be taken, however, that the aqueous solution of caustic soda or sodium carbonate is put first into the soap pan, and that the oleic acid is allowed to run in slowly while the mass is kept boiling, so as to avoid the formation of lumps of soap. If sodium carbonate be used, the boiling must be conducted with great care, so as to facilitate the evolution of the carbonic acid gas in such a way as to prevent the mass from foaming up and boiling over.

In consequence of the high price of glycerin it has become the customary thing to "deglycerinize" all soap stock fatty acids and for this reason the manufacture of soap from "soap stock fatty acids" has gained a wider extension, one of the chief advantages of this raw material being the saving in cost afforded by using sodium carbonate in place of caustic soda as far as the proportion of free fatty acid permits.

The neutralization of the soap stock fatty acids is carried out in the same manner as described for oleic acid. The soda solution must be heated first in the soap pan, and the soap stock fatty acids are introduced in small quantities, care being taken not to run in a further quantity before the carbonic acid has escaped so far that frothing over is prevented. The soap pan must be of much greater capacity than is required for making curd soap, as ample space must be allowed for the tendency of the effervescing mass to rise rapidly. It is of the utmost necessity to keep the mass well boiling. Some makers even pass a current of air through the boiling mass to facilitate the escape of the carbonic acid.

When all the carbonic acid has escaped the necessary caustic soda to saponify whatever neutral fat there may be in the mass is introduced; the boiling is then continued and the soap further treated as already described under curd soap.

In spite of the exaggerated claims made by interested parties regarding the advantages of working with soap stock fatty acids instead of with the natural oils and fats, the fact should be emphasized most strongly that soaps of the best quality are obtained only by boiling glycerides with caustic soda as described under curd soap.

None of these processes have been able to displace the boiling of neutral glycerides; nor are they likely to do so in the near future. Many installations erected for the production of soap stock fatty acids have been laid idle within the writer's experience, after practical results had demonstrated that first class soap could not be obtained from such material.

Marine Soaps.

This class of soap is so named because it is not insoluble in a strong solution of salt, hence it forms a lather and can be used for washing in sea water. Being thus soluble in salt water it cannot be salted out like common soaps. Cocoanut soap is typical of this class. Its property of absorbing large proportions of water, up to 80 per cent and yet present the appearance of a hard solid body makes the material a basis for the hydrated soaps, smooth and marbled, in which water, sulphate of soda and other alkaline solutions, soluble silicates, fuller's earth, starch, etc., play an important and bulky part. Cocoanut soap forms a principal ingredient in compound soaps meant to imitate curd and yellow soaps.

A further means of enabling a soap to contain large proportions of water and yet present a firm consistence is found in the use of silicate of soda. The silicate, in the form of a concentrated solution, is crutched or stirred into the soap in a mechanical mixing machine after the

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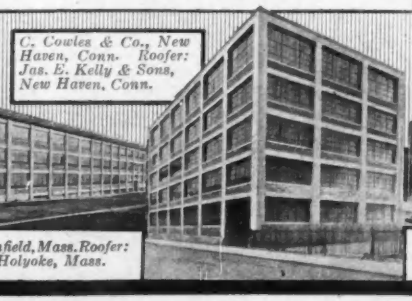
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completion of the saponification, and it appears to enter into a distinct chemical combination with the soap. While silicate soaps bear heavy watering, the soluble silicate itself is a powerful detergent, and it possesses certain advantages when used with hard waters.

Glycerides and Their Properties.

To thoroughly understand the soap making properties of the various fats and oils and their behavior in the soap kettle, it is necessary to be familiar with the chemical properties of the various glycerides which constitute the fats and oils employed in soap manufacture. The variation in the amount of the alkali absorbed by any particular fat or oil arises from difference in the composition of the glycerides themselves and from the varying proportions in which the glycerides occur in any particular stock. We know that fats and oils are indefinite mixtures of various glycerides, and the amount of alkali absorbed is influenced by the nature of the glycerides characteristic of the stock.

It will be seen from Table A that the amount of alkali required for saturation decreases as the molecular weight of the glyceride increases. Hence we find that those commercial fats and oils in which the glycerides of low molecular weight occur possess the highest alkali absorption in proportion to their weight.

The greater quantity of salt required for graining the soap made from such stock is due to the presence of those glycerides of low molecular weight whose greater solubility in brine of the sodium salt is a marked characteristic. As the glycerides increase in molecular weight, the solubility in brine of the soap obtained therefrom diminishes; hence less salt is required for graining.

The homologous properties of the glycerides are further shown in their practical application in soap making in Table A wherein is indicated the theoretical yield of anhydrous soap from the glycerides mentioned.

The reason for the greater yield of soap from cocoanut oil than from the ordinary animal and vegetable fats is thus made clear. Not only is there a greater yield of anhydrous soap in itself, but in virtue of that higher yield a greater degree of hydration and "filling" is thus permissible.

In Table B are given the actual and not the theoretical percentages of caustic potash and caustic soda required in practice to saponify the commercial fats and oils mentioned.

The various fats and oils that have already been considered display different characteristics in their behavior toward saponifying agents. Moreover, the chemical reactions of organic compounds do not proceed with the ease and certainty that characterize the reactions of inorganic compounds. In effecting combinations between fats and oils and caustic alkalis in a soap kettle where in many instances the fatty bodies are in excess of 1,000 pounds, the chemical peculiarities of the bodies undergoing change should in every case be thoroughly understood.

As will be explained later, the saponification of a fat is a progressive and step-like reaction, based on its chemical constitution as a triglyceride.

In a mixture of fats, the individual fats tend to impart their properties to one another. Certain oils, notably cocoanut and palm kernel, require caustic lye of high density to effect combination. With others, such as tallow and palm oil, saponification ensues readily with caustic soda of a lower density. When soap stocks with these different characteristics are mixed, the requirements of each are modified so that an oil requiring for saponification alone a lye of high density enters into combination with a lye of a density with which it would not combine otherwise without time-consuming and troublesome manipulation. On the other hand, that stock requiring naturally for ready saponification a lye of low density enters readily into combination with a lye of a higher density.

Saponification of Tallow.

Tallow requires a caustic lye of comparatively low density for satisfactory saponification. A 19 degree Tw. lye, when no subsequent dilution is made, is considered to give the best results. On boiling with open steam, however, a lye of 29 to 33 degrees Tw. is the highest density practicable. When open steam is used with caustic lye of this density, tallow is the most easily saponified of all glyceride soap stocks, and the soap formed by it is the most easily grained, i. e., separated from the spent lyes.

Sodium stearate, which constitutes the bulk of the anhydrous soap made from tallow, is one of the least soluble in water of all the alkaline salts of the fatty acids, as it undergoes practically no change when treated with 10 parts of water, neither is its hardness appreciably affected. This quality manifests itself in the inferior lathering properties of pure tallow soap. Further than this, on ageing, a tallow soap becomes so hard as to be used only with more or less injury to the fabric. The comparative insolubility of sodium stearate is also shown in the readiness with which tallow soap dries. Its presence in admixture

Glyceride and its Chief Sources.	Molecular Wt.	Yield on Saponification with Water.		Per cent Water Absrb'd	Yield on Saponification with Caustic Soda.		Per cent Caustic Soda Absrb'd
		Per cent Fatty Acids	Per cent Glycerin		Per cent Soap	Per cent Glycerin	
Laurin-cocoanut oil and palm kernel oils	638	94.04	14.42	8.46	104.38	14.42	18.80
Myristin-palm kernel oils	722	94.47	12.70	7.17	103.87	12.70	16.57
Palmitin - palm oil and tallow	806	95.28	11.41	6.69	103.47	11.41	14.88
Linolein-linseed oil.	878	95.68	10.48	6.16	103.19	10.48	13.67
Olein-olive and cottonseed oil	884	95.70	10.40	6.10	103.16	10.40	13.56
Stearin - tallow and lard	890	95.73	10.34	6.07	103.14	10.34	13.48
Ricinolein-castor oil	932	95.92	9.88	5.80	103.00	9.88	12.88
Arachidin-peanut oil	974	96.10	9.44	5.54	102.87	9.44	12.31

TABLE A.

Fat or Oil.	Per Cent Caustic Potash	Per Cent Caustic Soda
Lard Oil	19.1 - 19.6	13.6 - 14
Rape Oil	17.1 - 17.9	12.2 - 12.8
Whale Oil	18.8 - 22.4	13.4 - 16
Palm Nut Oil	22 - 24.7	15.7 - 17.7
Tallow	19.3 - 19.8	13.7 - 14.1
Sperm Oil	12.3 - 14	8.8 - 10
Palm Oil	19.6 - 20.2	14 - 14.4
Olive Kernel Oil	18.8	13.4
Olive Oil	19.1 - 19.6	13.6 - 14
Peanut Oil	19.1 - 19.6	13.6 - 14
Cottonseed Oil	19.1 - 19.6	13.6 - 14
Linseed Oil	18.7 - 19.5	13.3 - 14
Hempseed Oil	19.3	13.8
Cocoanut Oil	24.6 - 26.8	17.5 - 17.7
Bonefat and Grease	19.1 - 19.7	13.6 - 14
Castor Oil	17.6 - 18.1	12.5 - 13
Cod Oil	18.5 - 21.3	13.2 - 15.1
Rosin	17 - 19.3	12.1 - 14

TABLE B.

H & B AMERICAN MACHINE COMPANY

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Southern Office Atlanta Trust Co. Bldg. Atlanta, Ga.

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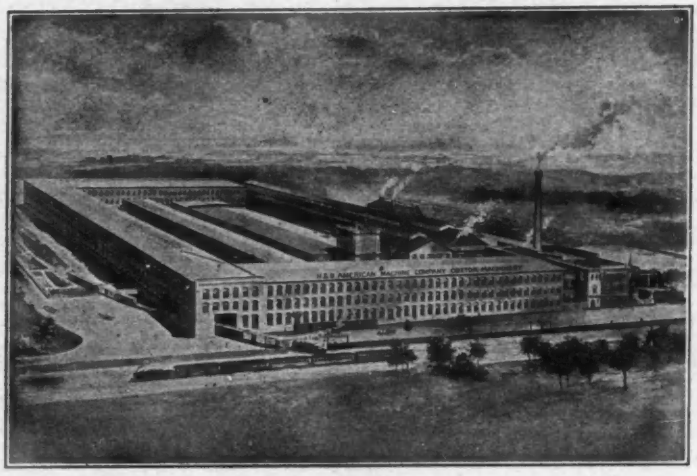
Card Room Machinery



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COTTON MACHINERY

with other fats imparts firmness or body to the soap, thus enabling a greater proportion of softer stock or that fatty acid whose sodium salt has a greater affinity for water, to be incorporated. Its use thus increases the amount of water that may be incorporated with a soap without an excessive sacrifice of firmness. It is the best raw material for the manufacture of grained (curd) soaps and admits of the greatest yield of all the animal soap stocks. With its use, the various chemical and physical changes occurring in the soap kettle during the process of boiling are well defined and of easy recognition.

Saponification of Cotton Seed Oil.

Refined cotton seed oil saponifies with difficulty and then only after continued boiling, especially when saponified alone. The absence of free fatty acids tends to hinder saponification. Combination with alkali and the formation of soap is, however, hastened when tallow is present, or, even on the addition of soap scraps. Saponification is best begun with a 23 degree Tw. lye.

Pure cotton seed oil soap is white, with a firmness determined largely by its degree of hydration. It consists mostly of sodium oleate. This compound is soluble in 10 parts of water, while sodium stearate, as we have seen, is not appreciably affected by this volume. In accordance with its greater solubility in water, we note, in comparison, its greater and peculiar lathering properties. It lathers more readily than does sodium stearate, but instead of the firm lather of tallow soap, obtained only after much rubbing, we have a slimy, thin lather peculiar to all soaps of stock consisting largely of olein, such as Castile soap and cotton seed oil soap stock. Cotton seed oil is generally used in admixture with varying proportions of tallow and grease.

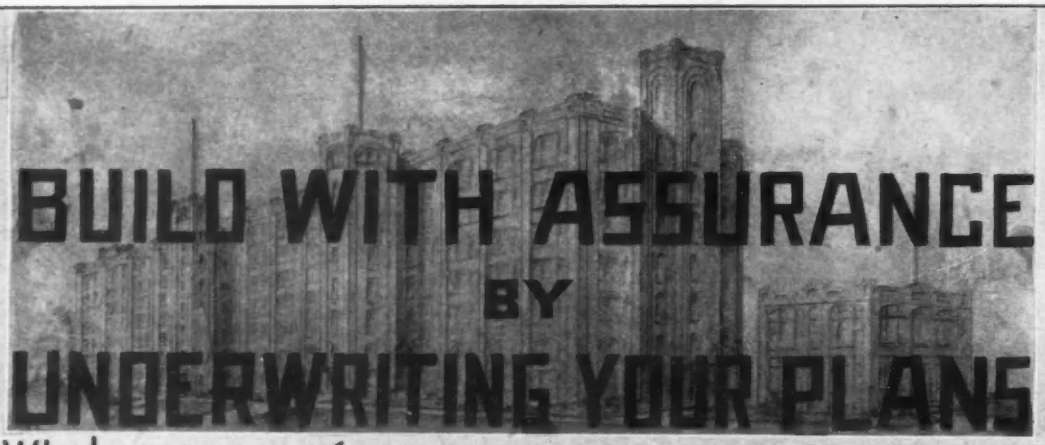
A good settled soap of cotton seed oil alone is not practicable. Soap thus made is thin and lacks the body and durability of a tallow soap or a soap made from mixed stock. By the use, however, of a large proportion of soda ash and sodium silicate, an artificial firmness may be imparted.

Cotton seed oil soaps sweat readily, and unless the oil has been refined with care, discolors rapidly and becomes rancid. The brownish or yellowish blotches seen in soaps containing cotton seed oil may be traced to the imperfect removal of the coloring matter of the seed during the refining process.

[This is the third of a series of articles on soaps. The fourth and last article will appear in an early number.]

H. A. Metz & Co., Inc. announce through their Charlotte office, in charge of J. D. Hunter, that they have brought out a new Sulphur Blue known as Sulphur Blue 5 G. This color has great affinity for cotton fibre and dyes readily. The fastness characteristic is about the same as their Sulphur Blue 3 B.

Worry is really a form of cowardice. It is born of fear and comes from the consciousness that we are not equal to cope with the obstacles that confront us.



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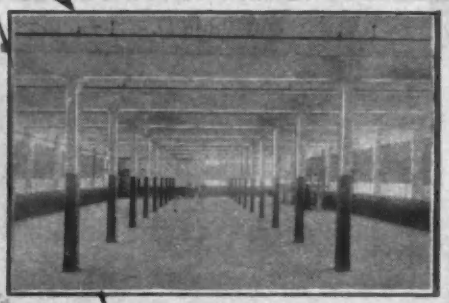

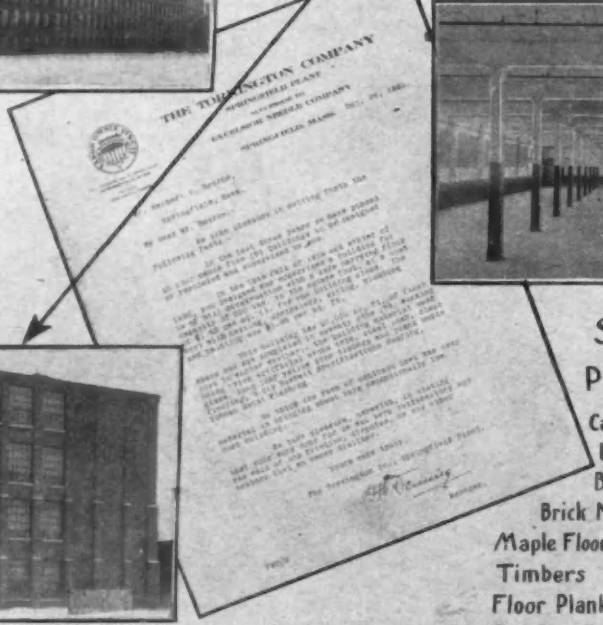

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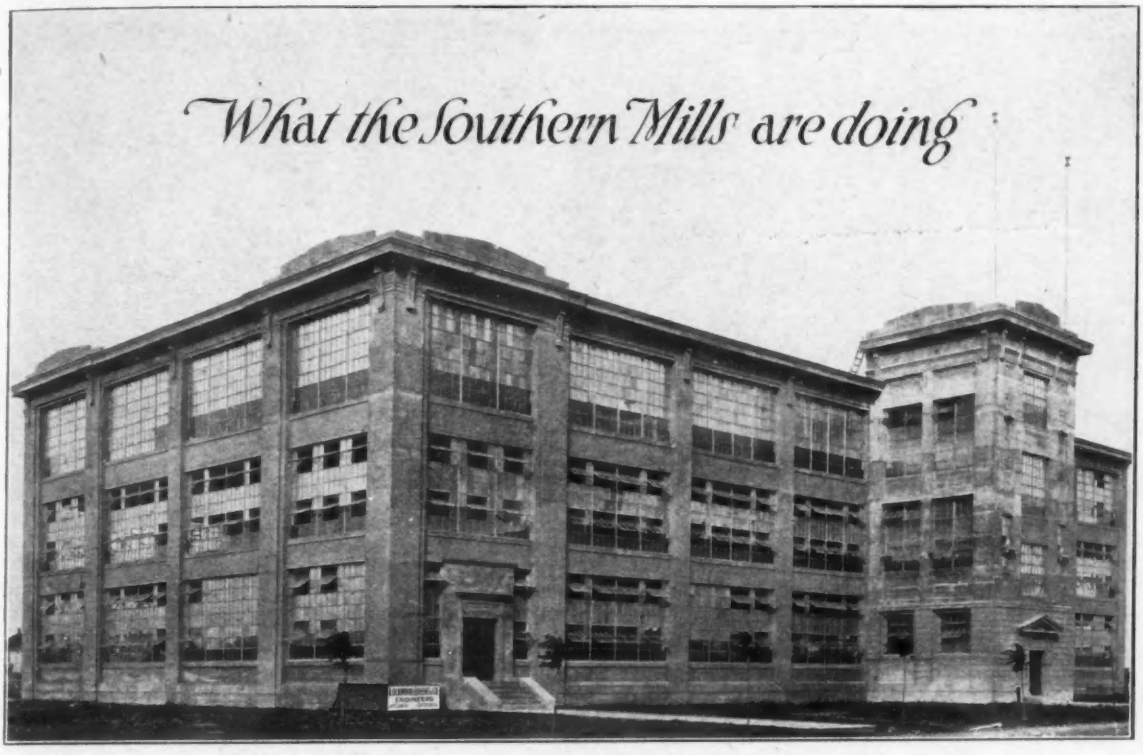
What the Southern Mills are doing



MILLER COTTON MILLS, WACO, TEXAS.

Under the auspices of the industrial education department of Clemson College, a series of trade and industrial instruction or teacher training classes are being conducted in various cotton mills in the state of South Carolina. The work is being carried out under the direction of Harold B. Adams, who is professor in industrial education at Clemson College. The aim of this work is to train men to act as instructors for the various night schools and part-time classes in textile work throughout the state. The men attending these instruction classes include, in the large part, overseers in cotton mills, with a small percentage of second hands and section men. These prospective instructors receive instruction in analysis and classification of trade knowledge, how to arrange in an efficient manner the different jobs that go to compose their work, and how to effectively and efficiently impart their knowledge to the other fellow.

At this writing, Professor Adams advises that these classes have been conducted at ten textile corporations, with the average time spent at each corporation from ten days to two weeks. The average number of men in the classes has been seven, and the average attendance at class during the time spent at each mill has been 95 per cent of the enrollment. Overseers composed 95 per cent of the attendance, and the remaining five per cent were second hands and section men.

The cooperation received from and the interest shown by the men attending these teacher training classes have been very keen, states Professor Adams, and the cooperation and assistance rendered by the mill corporations has been all that could be asked for.

The students at these classes are taught to conduct classes in all branches of mill work, including carding, spinning, weaving, twisting, fixing, designing and textile mechanics and textile mathematics.

The direct results from training such men along these lines should be very valuable. They may become instructors in the various branches of the cotton manufacturing business with which they are familiar and in which they have had years of experience. Indirectly, fruitful benefits are received from such work by making the men better executives and handlers of men.

They are better fitted to train the operatives to be more efficient in their work, and to understand the why of what they do as well as the how.

In general, the work leads to the increasing of human efficiency and skill, reducing "human waste" and attempting to make all interested in more satisfied and happier operatives, due to efficient training and a more complete mastery of their jobs. A closer relationship is established between the overseer and his operatives, all striving to help the other fellow and to solve all problems to the mutual satisfaction of all concerned.

At a joint meeting of the two organizations, held in Charlotte, N. C., on February 24, the Southern Spinners' Association and the Southern Soft Yarn Spinners' Association were consolidated into one organization, to be known as the Southern Consolidated Yarn Spinners' Association. This action was the result of plans that had been under way for some time. Robert Chapman, of Spartanburg, S. C., was elected president of the new association. W. B. Moore, York, S. C., was elected vice-president, and Carl H. Hart, also of York, secretary. The executive committee is composed of the following: L. D. Tyson, Knoxville, Tenn.; W. Stackhouse, Monroe, N. C.; J. A. Long, Roxboro, N. C.; H. A. Rhyne, Mt. Holly, N. C.; R. L.

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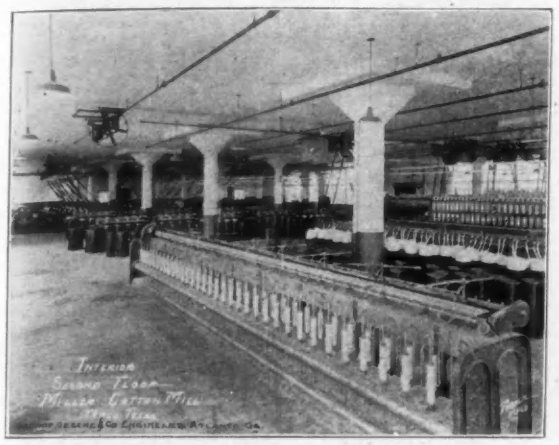


Carding Department at the Miller Cotton Mills, Waco, Texas.

Reinhart, Lincolnton, N. C.; C. J. Swift, Columbus, Ga.; C. E. Hutchison, Mt. Holly, N. C.; J. E. Erwin, Morgantown, N. C.; Scott Roberts, Anniston, Ala.; A. L. Jackson, Tallapoosa, Ala.; E. H. Williamson, Fayetteville, N. C., and A. R. McEachern, St. Paul, N. C. It is planned that this committee, with the officials of the association, will hereafter meet semi-monthly in an effort to keep the work of the association as active as possible.

The new million dollar state penitentiary that will be erected near Montgomery, Ala., is to have a large and well equipped cotton mill and overall factory, it has been announced from the office of Governor Kilby. Cotton to be consumed by the mills, or at least a large amount of it, will be raised upon State lands.

The Ware Shoals Manufacturing Company, Ware Shoals, S. C., has made arrangements with the International Correspondence Schools, Scranton, Pa., to furnish special correspondence courses to the employees of this company. It is announced by the company that a special discount of 20 per cent will be given off the regular price of these special courses; and the company states it will refund 25 per cent of the cost of the course to every employee who finishes such a course and receives a diploma while in the employ of the Ware Shoals Manufacturing Company.

The Garner-Whitehead Neckwear Company, Burlington, N. C., was recently organized by local business men and will establish a mill for the manufacture of neckwear for both domestic and foreign trade. T. E. Garner and R. H. Whitehead are the members of the new concern.

Work on a modern $30,000 cafeteria, to be operated in connection with the Blue Bell Overall plant, is under way at Greensboro, N. C., it is announced. The cafeteria will be operated solely for the benefit of the employees.

The Handley Cotton Mills, Roanoke, Ala., have just installed 28 new looms in their weave room.

It is expected that the new plant of the Efird Manufacturing Company, at Albemarle, N. C., will be in operation shortly.

The property of the Twine Mills Corporation, in Norwich, a suburb of Roanoke, Va., which employs 250 operatives, has been sold to the Morice Twine Mills Corporation of New York. The purchase price was reported as $230,000.

The Georgia Manufacturing Company, Gainesville, Ga., has plans under way for the erection of a two-story addition to its mill, to be of brick, steel and re-inforced concrete construction, 50x200 feet, and estimated to cost about $100,000, this figure including the cost of equipment.

A View of the Weave Room, Miller Cotton Mills.

The American Yarn and Processing Co., Mt. Holly, N. C., is installing two six-ton refrigerating plants for cooling the chemicals used in mercerizing their goods.

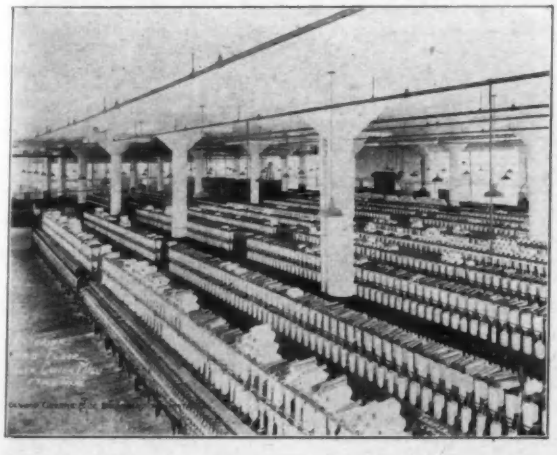
The Delburg-Linden Co., Davidson, N. C., recently capitalized at $500,000, has preliminary plans under way for its proposed mill for the manufacture of cotton. J. P. Monroe and J. L. Douglas head the company.

The Social Circle (Ga.) Cotton Mill Company is installing 10,000 additional spindles in its wide sheeting mill.

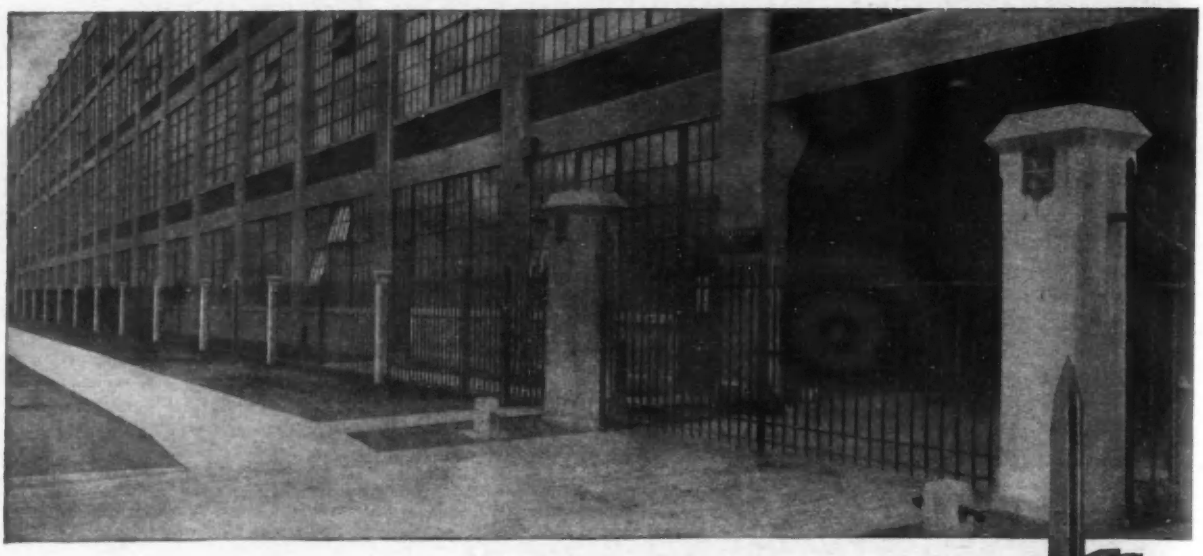
The Entwistle Manufacturing Company and the Pee Dee Manufacturing Company, Rockingham, N. C., will add to the facilities of their mill villages by the construction of water works and sewer systems. For each town there will be placed a 10,000-gallon tank with the necessary water mains, pump and sewer connections.

The Knoxville Spinning Company, Knoxville, Tenn., has increased its capital from $150,000 to $300,000. This mill manufactures knitting yarns.

It was decided at a recent meeting of the stockholders of the Cash Cotton Mills, Gaffney, S. C., which recently went into the hands of a receiver, to effect a reorganiza-



Spinning Room of the Miller Cotton Mills, Waco, Tex.



Here is a Railing that will Endure

WE have solved the problem by attacking it from a new angle. Instead of passing each picket through holes in the top and bottom rails, and trying to secure it in place with wedges, bolts, lugs, or rivets, we have used the method shown at the right of this page.

The iron railing had always presented a difficult problem. It was almost impossible to make a single well-proportioned panel that would cover a span of more than 5 feet without sagging. For this reason it was common practice to erect railings along the top of low walls, or else to provide a centre supporting-leg, which called for foundations constructed so close together that the job entailed heavy expense.

By using a special steel grooved square rod for both pickets and rails, and electrically welding these at every intersection, we have succeeded in building panels 10 feet long, and dispensing with the centre supporting-leg entirely. The strength of this construction is enormous; a panel at the above installation safely sustained 5 men whose combined weight is 850 pounds, without any apparent deflection.

Such panels, in any height from 3 to 8 feet, may be supported upon anchored I-beam posts or set between columns. Perfect alignment, strength and rigidity combine to make Anchor Post Electrically Welded Railings and Gates both pleasing and effective.

Let us tell you more about it.

Our Branch Offices, listed below, could send a representative to look over the property and submit designs and prices. We would be glad to furnish you with any further information by mail, if desired.

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Anchor Post Fences

tion of the corporation and issue $400,000 in new stock, so as to continue the operation of the mills. The authorized capital of the company, at its inception, was $500,000. One hundred thousand dollars of the new issue will be used to retire that amount of outstanding bonds, and the new money to be used in running the mill will be obtained from stock issued in the form of a preferred stock. If this plan meets with the approval of the court, the receivership will be dismissed and officers will be chosen to operate the plant. It is the reported opinion of Dr. W. T. Hamrick, the receiver, that the mills should be able to start operation very shortly under the proposed arrangement.

A cotton mill company has been organized at Kingsville, Texas, with a capital stock of $300,000 to manufacture 8s to 12s ply yarns. The following board of directors has been appointed, Robert J. Kleberg, C. H. Flats, Jr., E. W. House, Ben F. Wilson, W. D. McNeill, D. H. Allison, D. G. Cage, J. S. Nolan and R. A. Dimmick. The designing and construction work is in charge of W. D. McNeill and D. H. Jones, of Fayetteville, N. C., who will operate the plant when completed. The mill will be equipped with the most modern machinery for making ply yarns and paralleling machinery will be used instead of spoolers. Kingsville is located in the fertile fields of South Texas, on the St. L. B. & M. R. R., and with its abundant supply of natural gas, oil fields, splendid water, and ample supply of labor, it is stated, this location should become a city of great importance.

The Anniston (Ala.) Cordage Company will install 5,000 spindles in a new addition it plans to erect.

The American Cotton Mills, Inc., Bessemer City, N. C., has started up its spinning frames and will soon have its looms in operation on tire fabric, etc.

Authority to increase its capital stock from $200,000 to $400,000 has been granted to the Conestee Mills, Greenville, S. C.

The Acme, Sterling and Crescent Mills, at Belmont, N. C., have installed all machinery, and everything is in readiness for the manufacture of yarn. The villages for all of these mills have been very attractively laid out and the houses are fitted with all modern conveniences, running water, electric lights, sewerage, etc.

The Helena Spinning Co., West Helena, Ark., is arranging for the rebuilding of its picker department, recently damaged by fire.

The Consolidated Textile Corporation is having preliminary plans prepared for the erection of a new two-story brick warehouse at their plant at Lynchburg, Va., to cost about $40,000. J. E. Sirrine & Company, Greenville, S. C., are the engineers.

The Arkansas Cotton Mills Company has been organized at Little Rock, Ark., with a capital of $3,000,000. They plan to erect and maintain a chain of mills throughout the state of Arkansas for the manufacture of cotton cloth. E. Dalton, Pocahontas, Ark., is the president of the new concern, and T. W. Campbell, Reigler Building, Little Rock, Ark., is the secretary and treasurer. They contemplate using 10,000 h. p. of hydro-electric power. The mills, when erected, will be the first in Arkansas to manufacture cotton into cloth.

The Sapona Cotton Mills, Cedar Falls, N. C., will construct a three-story spinning plant of standard mill construction for the manufacture of hosiery yarns, with a capacity of 4,000 spindles. W. J. Armfield, Jr., of Ashboro, N. C., is secretary and treasurer.

The Sanford (N. C.) Cotton Mills have completed the installation of considerable new equipment for increased production, including a number of extensions and improvements to accommodate the new machinery. The work represents an investment said to be about $225,000.

The Riverdale Cotton Mills, West Point, Ga., have arranged for a merger with the West Point Manufacturing Co., under the latter name.

The Chesterfield Manufacturing Company, Petersburg, Va., manufacturer of cotton yarns, etc., has construction under way on a new hydro-electric power plant in Chesterfield County for general mill service. A concrete dam and spillway have been completed at a cost of about $75,000, and installation of power generating equipment will be commenced shortly. The company also has preliminary plans for the erection of a new mill, to supplement its present works on Swift's Creek. J. F. Taylor, Kinston, N. C., is president and treasurer of the company.

The New England Mill Situation.

The drop in the cotton markets has been followed by a drop in cloth and yarn values to levels that ought to stimulate business and has not done so. Proportionally, the cloth decline has been greater than the cotton decline. In the early part of January 38½ inch 64 x 60 print cloths sold at 8¾ cents and is now quoted around 6½ cents, which is equivalent to 13 cents a pound in cloth. Under normal conditions cotton manufacturers would welcome a cotton decline. But it is recognized that one of the greatest of the country's crops is involved and the farmer is suffering losses that no reserve could provide against. In the conservatively managed cotton mills of New England reserves to withstand the price decline in cloth and cotton on hand had been built up consistently, and they were kept in hand by a severe curtailment of production in the last half of last year. The planter could take no such precautionary method and the loss is being felt in manufacturing as elsewhere.

Had it been possible to have stabilized the cotton markets around 15 cents a pound, the basis on which January cloth prices were made, the cotton manufacturers would have been better satisfied. As matters now stand, they are again facing the necessity for curtailment, and are even beginning it to avoid accumulating stocks for which there is no market on any basis of profit now in sight.

The mills that make the best known standard products are still running on past orders. The time is close at hand when more dealers must come forward or these mills will be forced into the position of many of those making print cloths and convertibles, to elect between operating at a loss while piling up product, or closing down until a further reduction in costs can be brought about. Already there are talks of a further wage reduction that must be made in June to meet the reductions announced in southern mill centers.

The prices were named on napped cottons for fall delivery by the Amoskeag Company on March 10, and were unexpectedly low. The last prices were named in January of 1920 on a basis of 37½ cents for Daisy cloth, a standard colored domet. The new price on the same cloth was 12½

cents. This reduction of 66 per cent was the most radical ever made on merchandise of this character. It was in keeping with the reductions that have taken place in other cloths, gradually, since the early part of last year. After the new prices were named it was stated that the mills had no stocks on hand. They had purposely refrained from accumulating stocks after deliveries were completed in September of last year and this gave customers an opportunity to liquidate.

Other manufacturers are following the lead of the Amoskeag in making a low price basis and it is believed that all of them are anticipating a wage reduction. Deliveries are to be made from June till October. It has already appeared that cutters and many of the jobbers realize the situation as to stocks and have laid down very satisfactory mill orders. On some cloths they have ordered more than can be produced in the time given. Nothing has been done as yet on prices for cotton blankets and it seems probable that this will be delayed for another month. The prices named on wool blankets were very low, and there has been market competition in liquidating stocks, with many of the blankets made for the government.

The gingham situation continues excellent. Stocks do not exist in first hands and cutters and jobbers have been asking for additional deliveries in excess of the orders placed some time ago. The cutters have been very active on ginghams both on staples and dress ginghams, so that in this quarter the market is on a sound footing. The market for wide sheetings, sheets and pillow cases, and some of the finer muslins and longcloths has continued good. But in most instances the standard branded fabrics have had a preference in the markets.

The print cloth markets have been very weak. A drop of more than 25 per cent on some constructions has occurred while less than a third of the output has been sold. There have been some mill orders that have been filled but during March goods began to accumulate and mills began gradually to run short time or stop some of the machinery. The specialty fabrics made for the automobile trade have been very dull and most of the users have been absorbing stocks made up on past orders, that mills refused to cancel. There has been some improvement in the demand, compared with the stagnation of a couple of months ago, and this is reflected in a resumption of operations in a few of the mills built to make tire fabrics and other special cloths. There is still a long way to go before these specialty mills will be fully employed again.

Prints and percales have been moving out steadily on past orders and the three largest print works have been very busy, running in full. The advances that were asked on percales did not hold long, as buyers would not pay above 12 cents for 4-4 64 x 60s. These goods have gone very largely to the cutting trades and the corporation printers secured most of the business. There has been a steady business done on cretonnes, and fancy prints. The printing departments of the large finishing companies have been doing better than either the bleaching or piece dyeing departments. Some of the job printers have booked a fair volume of business on shirtings, sleeve linings, and other specialties but have done less than they anticipated on dress fabrics. Voiles have been called for quite freely, although in the past three or four weeks there has been a growing call for tinted lawns and batistes.

The bleacheries were doing very well in February and are still doing quite a business on old orders. The drop in cloths and the unsettled condition following has limited business somewhat. The leading branded lines of bleached cottons have sold steadily.

The cotton yarn trade has been unsatisfactory. Prices on combed yarns have been low and the little business offered has been secured in close competition. The curtailment of production has persisted longer in the yarn mills than in the cloth mills, although, as stated, the auto tire fabric and specialty fabric mills are still idle in many departments. One of the difficulties of getting the yarn business into better shape arose from the demands of the knitters and men's wear weavers for very low prices spinners would not meet. The hosiery knitters who use fine combed numbers were particularly disturbed by the inability to bring down yarn prices, especially on mercerized yarns. Recently there have been signs of a change due to the auction sale of 5,000 cases of Ipswich hosiery, which seemed to set a value on made up goods neither knitters nor spinners could fail to recognize and prepare for.

There has been some gain in the volume of fancy fine goods business recently although most of the New Bedford mills have not been doing much in fine plain cloths. There have been some good sized fine shirting orders placed and some of the silk and cotton specialties have been ordered for future delivery.

The mill machinery shops have not felt the reaction in business in the same degree as cloth and yarn mills. Most of the large concerns are still busy on old orders that will not be completed before the end of this year. One of the largest loom works will not undertake new deliveries this side of July and another has not been able to take care of all the small filling in business that has been offered. The explanation of the continued business in the shops is found in the fact that some satisfactory foreign orders were placed and payment was fully guaranteed before they were undertaken. It is also true that some concerns undertook renewals that were provided for before the break came and have not been countermanded.

Opinion varies greatly among New England mill men concerning the future course of business. The immediate situation is one of serious complications arising from the declining purchasing power at home, where wage reductions among railroad and large industrial workers are being faced. These are supplementing the contracted buying power of the agricultural communities. If textile values alone were considered, they would be inclined to think that the reaction has been almost complete, in both prices and wages. Yet it is now well known that southern wage reductions have extended farther than those in New England and the latter must be put on a competitive basis before any sound progress can be made. The wage period does not expire till June and nothing will be done in a general way before then.

But there is a feeling in some places that even if wage costs were down there would still be lacking a market broad enough to take care of the possible output. New England products were exported very freely in the past few years and the section will miss the export trade in cotton goods more than it will be harmed by the increased imports of the past few months.

It is clear enough that money for doing business is going to be high and this is felt so much that mills that would like to buy some of the very cheap cotton offered, cannot do so without paying a prohibitive rate. Moreover, it is not yet certain that coal costs are going to come down or that other supplies will drop much before the middle of the year.

The one thing settled is that it is not time to pile up goods nor to go on forcing prices down. The general thought is that it may be prudent to enter upon a further curtailment plan to be worked out as individual judgment and conditions dictate, and at this writing that is the trend.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, March 9th, 1921.

The tendency of market remained downward during the past month, due to the failure of the spot demand to revive, which, in turn was attributed to the unfavorable European political and financial situation; as a result values are about $10 per bale lower than one month ago, with middling in New Orleans quoted today at 11 cents, or within 25 points of the lowest level reached thus far this season.

The attitude of Germany in regard to meeting the reparations demanded by the Allies has been disappointing, necessitating the invasion of that country to compel obedience to the penalty imposed upon her.

Failure of American spinners to enter the market, except for immediate wants, notwithstanding their stocks being the smallest for many years past, and the fact that prices of the raw product are lower than they have been in seven years, not to mention the fact that present prices are below the cost of production under existing conditions, was responsible to a great extent for values declining to so low a level of late.

To March 4th, compared with last season, spinners takings of American cotton this season figured as follows:

Bales	This Season	Last Season
North and Canada	1,059,000	2,169,000
Southern	2,025,000	2,997,000
Foreign spinners	3,166,000	3,680,000
Total by world	6,250,000	8,846,000

By the above it will be seen that while foreign spinners have taken 514,000 bales less of American cotton, takings by American mills are 2,082,000 smaller than to even date last season, of which deficit 1,110,000 are credited to the North and 972,000 to the South. Therefore, the main cause of the depression in market is due to the very poor demand from the American mills from the opening of the season to the present day.

However, there is a ray of hope of the demand improving from now on, as economic conditions are gradually improving in America where industrial activity is becoming more evident. The last of the industries to improve being in the woolen manufacturing districts.

Aside of these features, domestic mills hold very light stocks of the raw product, jobbers are said to hold limited stocks of the finished product, and retailers throughout the country are reported to have scant supplies of shelf goods.

In Europe, British mills have been operating on half time since the middle of last December, and French spinners have been running on short time for a long while. Therefore, it is evident that the consuming markets of Europe and Asia possess light stocks of goods because of the small output by the mills and light exports.

Therefore there is every prospect of business improving in the future, particularly when the world realizes that the South is in earnest in its effort to make a drastic reduction in this year's cotton acreage, and the probability of the new administration in Washington adopting a very high tariff for protection of American farm and manufacturing interests, in advance of which, buying, to avoid paying higher prices, is likely to increase.

That there are good prospects for a decided reduction in the acreage and in the use of fertilizer this year is noted in the following official tonnage figures as to sales of fertilizer from August 1st to February 28th, compared with last year:

	This Season	Last Season
Georgia	197,995	651,968
South Carolina	283,412	765,780
(X) Alabama	57,633	178,109
Mississippi	21,786	75,550
Arkansas	20,710	48,930
Louisiana	28,003	51,480
Texas	15,420	33,956
Total 7 states	624,959	1,805,773

(X)—October 1 to February 28.

North Carolina does not report tonnage but reports a decrease of 71 per cent compared with last year. Oklahoma reports that for seven months last year approximately 4,000 tons were sold, but owing to high price of fertilizer and low price of cotton, use of fertilizer this year has been greatly reduced.

The 1921 Textile Manufacturer Year Book has been issued and is now ready for distribution. This, the third issue, contains several new features not included in the two previous editions; prominent among these is an article on the sizing of cotton warps, which gives a clear exposition of the characteristic properties of different sizing materials and practical hints on how these should be used for best results. A table of weaving particulars for standard makes of woolen and worsted fabrics is also included, as is an article on the guiding principles of good ventilation. The numbers of cotton mills, spindles and looms in all countries of the world are given in tabular form, and also a table of the world's cotton crop returns.

The primary object of the "Year Book" is to provide mill men with a handy collection of notes, rules, tables and other data, and a special endeavor is made to include matters not readily accessible to textile men. The publishers are Emmott & Co., Ltd., 65 King St., Manchester, England.

Do not disparage rivals, nor run down another man's goods. If you do not know what to say, say nothing.

Prosperity not earned is like good cheer gotten from drink and drugs.

Notes About Men You Know.

C. J. HUNT.

C. J. HUNT, one of the best known paint authorities in the country, recently made a trip through the southern section covering the principal textile mills and other industrial plants where the products of his company, Wadsworth, Howland & Co., Inc., of Boston, are used. Mr. Hunt has been connected with this organization for 36 years, of which 18 years have been spent in active service for the company's interests. He is now manager in charge of their sales promotion, and makes two trips a year throughout the southern textile field. His years of experience in the paint business covers practically every state in the country, he has made 41 trips to the Pacific coast, and has traveled also in Mexico, Cuba, South America and Barbados. He is one of the oldest salesmen, in point of service, now connected with Wadsworth, Howland & Co. The products which are made by this company for use in the textile industry include the well known Bay State line of paints, roofing stain, varnishes, brick and cement coating for mill buildings and villages, Dixielite white finish in flat and semi-gloss for mill building walls and ceilings, and Bay State cement floor hardener.

W. C. RUFFIN, treasurer of the Mayo Mills, Mayodan, N. C.; the Twine Mills Corporation, Roanoke, Va.; the Washington Mills, Fries, Va.; and the Mt. Airy (N. C.) Mills, died in Winston-Salem, N. C., on February 18, following an operation for appendicitis. Mr. Ruffin was 55 years of age, and was a grandson of the late Chief Justice Thomas Ruffin of the North Carolina Supreme Court.

Mr. Ruffin was a former president of the North Carolina Cotton Manufacturers' Association, holding the office in 1916-17. He was also a former member of the board of governors of the American Cotton Manufacturers' Association and a member of the executive committee of the Southern Cotton Manufacturers. He is survived by his widow and four children.

W. F. STROUD has succeeded A. W. Hales as secretary and treasurer of the Buck Creek Cotton Mills, Siluria, Ala.

F. W. WORRELL recently was appointed overseer of carding at the Bibb Manufacturing Company's Mill No. 1, at Macon, Ga.

F. E. TIPTON.

F. E. TIPTON has been appointed sales manager of the Toledo Scale Company for the southern district, with headquarters at Atlanta. Mr. Tipton previously was sales agent for this company for the territory including North and South Carolina, and the district over which he will have supervision has now been extended to include also Georgia, Alabama, Florida and eastern Tennessee.

Mr. Tipton joined the Toledo Scale organization as a salesman in 1916, and was first assigned to Rocky Mount, N. C. The standard of success in the sales organization of this company in the United States and Canada is membership in the 100% Club, to which salesmen annually gain admission by selling the quota assigned them for the entire year. Mr. Tipton made the 1916 100% Club in the first ten months and has succeeded in becoming a member of the Club every succeeding year. The salesman who has the highest percentage of quota in the United States and Canada for the year automatically becomes president. Mr. Tipton, as sales agent for North and South Carolina, gained this honor in the 1920 Club with 286 per cent of his quota.

Mr. Tipton is looking forward to a very large expansion of business in the southern district during the present year. He will have a large number of experienced salesmen under his direction, and sales room and complete service departments will be maintained at the district headquarters in Atlanta and in other important cities throughout the southern district.

Time was when you liked to take a chance on a lucky packet, but you do not use that method in business.

Warren Soap and Warren Service combine the accumulated experience of a large part of the textile trade during fifty years with the most up-to-date scientific investigation.

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STRAIGHT LINE METHODS

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OF
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The value of these charts to the executive or manager in any line of business cannot be exaggerated. They make visible at a glance all progress or decline. They locate weakness and waste; disclose hidden sources of revenue; suggest balance, and point out logical development. It is impossible to avoid their mathematical conclusions. They are simple, definite, final.

Ernst and Ernst Business Graphics are the work of a large and highly specialized department. The preparation of charts is based on sound engineering and accounting principles. These charts reduce to a comparable basis, instantly visible, all elements of a business of whatever magnitude. And by the use of simple standardized methods, the actual preparation of charts is made possible and practical by the clerks of your own office.

Our pamphlet on "Business Graphics," with sample charts in colors, to executives or managers on request.

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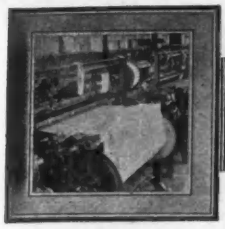
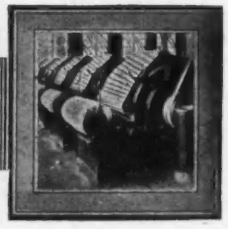
BOSTON	ST. PAUL	PITTSBURGH	TOLEDO	FORT WORTH
PROVIDENCE	ST. LOUIS	DETROIT	ATLANTA	HOUSTON
WASHINGTON	KANSAS CITY		RICHMOND	DENVER

STRAIGHT LINE METHODS



How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects



Taking Out Twist on Fine Speeders.

EDITOR COTTON:

I have been very much interested in the discussion of "D. F.," "Contributor No. 19" and "Wash (Conn.)" on taking out twist on fine speeders.

Like "Contributor No. 19," I am puzzled over that 124 r. p. m. of the front roll. This gives a twist multiplier of 1.20. By this I mean that the square root of 6 multiplied by 1.20 will give the twist per inch that "Wash" was putting into his 6.00 hank roving. And a 1⅛-inch front roll running 124 r. p. m. with a spindle speed of 1,300 will give the same number of turns per inch as the square root of 6 multiplied by 1.20.

Now this 1.20 multiplier is considered a standard but we all know that it varies for different lengths of staple and also varies with the four different processes of fly frames. But American machinery builders figure their catalog tables with this multiplier of 1.20, ignoring the length of staple or the process. So their catalogs call for 2.94 turns per inch for 6.00 hank roving and the Woonsocket catalog for a speed of 1,300 on the spindle, call for 124 r. p. m. of the front roll to give 2.94 turns per inch.

The idea is to keep this multiplier just as low as possible for the higher we have to go the less our production will be, due to decreased front roll speed.

"Wash" can make 6.00 hank roving from 1 1/16 inch stock using a multiplier of 1.20.

"Contributor No. 19," running 1 1/16 inch stock and making a 5.80 hank roving with a front roll speed of 99 r. p. m. and 1,300 on the spindle is inserting 3.71 turns of twist per inch into his roving. This calls for a multiplier of 1.57 which is 25 per cent greater than that used by "Wash" and will reduce his production practically 20 per cent below that obtained by "Wash," other things being equal.

"Contributor No. 19" is doing a good job on his 28s yarn. The break is good which shows he is not treating his stock too harshly and that his machines are in fairly good shape. If his bottom cone was working too hard he would find it showing up in the breaking strength. If he was stretching his roving he would find that also. But he has evidently been trying to reduce that multiplier and cannot seem to make a go of it. Well, there are a lot of us who cannot bring our multiplier down to 1.20 on 1 1/16 inch stock, and who would like to know how to do it. I can do it on 1⅜ inch peeler stock, but I cannot do it on anything under that.

Before "Contributor No. 19" changes his organization as outlined by "Wash," I would like for him to look over the following organization sheet for making 5.80 hank roving from 1⅛-inch stock. This was only one of four different kinds of stock being run at this time and was the shortest of the four, the longest being 1⅝ Sea Island stock.

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Stock is 1⅛ Upland grading from good middling to strict good middling.

Mixing consisted of 10 bales made by bale opener and carried to the bin by a fan system.

Breaker picker. Beater speed, 940 r. p. m.; beater is 18 inch—two bladed type; r. p. m. calender rolls, 7.18; weight of lap, 14 ounces per yard.

Intermediate picker. Beater speed, 940 r. p. m.; beater is 18 inch—two bladed type; r. p. m. calender rolls, 7.54; doublings, 3 (not 4); weight of lap, 13 ounces per yard.

Finisher picker. Beater speed, 940 r. p. m.; beater is 18 inch—two bladed type; r. p. m. calender rolls, 7.54; weight of lap, 12 ounces per yard; doubling, 3 (not 4).

Cards. Weight of card sliver, 50 grains; doffer speed, 7½ r. p. m.

Drawing. Two processes of drawing were used, with common rolls. Front roll speed, 310 r. p. m. on each. 1st process, 51 grain sliver; 2nd process, 52 grain sliver.

Slubber. 12 x 6 inch. Spindle speed, 500 r. p. m.; hank roving .75 hk., twist per inch, 1.12; twist multiplier, 1.29.

Intermediate. 10 x 5 inch. Spindle speed, 780 r. p. m. hank roving, 2.00 hk.; twist per inch, 1.85; twist multiplier, 1.31.

Fine Speeders. 8 x 3½ inch. Spindle speed, 1,050 r. p. m.; hank roving, 5.80 hk.; twist per inch, 3.27; twist multiplier, 1.36.

One thing to be remembered on this organization is that quality was the one thing wanted. We made nothing but the best. I think this line-up for 5.80 hank roving is going "Wash's" recommendations to "Contributor No. 19" just one better, but I could not get the multiplier below 1.36 and I was pushing it rather hard at that. We might have had less trouble at 1.40.

Please submit this to "Wash" and "Contributor No. 19," so that we may have the benefit of their experience and advice. I cannot help but feel that "Wash" must have something up his sleeve that he hasn't told us about

yet. All I can say to him is this, those 28 frames of 192 spindles each that produced 1,316 hanks in 58 hours did not have any tight slides or lifting shafts.

S. A. F. (R. I.)

EDITOR COTTON:

In the February number of COTTON I notice a communication in the Practical Discussion Department covering a lay-out of a carding department which was described by "Contributor No. 19," and note that he asks that this lay-out be submitted to "Wash (Conn.)" for his approval and recommendations. I also have read with great interest the suggestions offered by "Wash" in his reply.

While I understand that this inquiry was for "Wash," may I have the permission to submit a few remarks toward the required adjustments to be made by "Contributor No. 19" in his carding department, and also at the same time voice a few remarks, not meaningly in opposition to "Wash's" reply, but simply to place my version of the way "Contributor No. 19" should be guided out of his difficulty?

While I realize that a mixture of a large number of bales is quite essential in blending color and staples, perhaps "Contributor No. 19" may be utilizing all of the space available, and if such be the circumstances, if he will but look up the December, February and March numbers of COTTON and read carefully the communications signed "A.B.C. (R. I.)," he will find the solution for a foundation of a yarn that can be handled with less twist and a slower flyer speed, not a faster one. For when more speed is applied to a spindle, invariably more twist is required to handle that speed; thus slowing the front roll and the results stand practically the same for production, with a greater amount of labor required on the part of the operative. If the suggestions in the communications referred to are followed carefully, he will find that he won't be satisfied with anything less than a 15 or 16 ounce lap from his finisher picker, and the foundation will then be laid for any form of maneuvers desirable.

Then, by retaining the 52 grain sliver from the card and using the 16 ounce lap, he will find a cleaner quality of cotton coming from his doffers because he has increased the length of the draft of the card to the neighborhood of 135 inches.

This extra draft—provided the picker lap is made according to directions given in the articles mentioned—takes place between the feed roll and licker-in, allowing the licker to pass through the inches fed a greater number of times, removing practically all the foreign matter there is left in the lap web.

I should say that under his present lay-out, "Contributor No. 19" is beating his cotton too much. I would like for him to try setting the feed plate to a 7 gauge. If he is running his doffers below 9 turns, he should change them to 9 turns and reduce the card sliver in the same percentage that the speed of the doffer was increased, thus retaining the original production with a lighter sliver per yard and a still longer card draft, still cleaner work and a better sliver to draw in the breaker drawing frame.

With these changes on the pickers and cards, he will find that he is making somewhere in the neighborhood of a 45 grain sliver, this may be drawn to a 47 on the first drawing, the intermediate drawing to a 48 or 49, and the finisher to a 50 or 52 grain sliver.

With regard to the front roll speed, I have made a far greater production and a smoother sliver by slowing the front roll to 15 per cent over the actual production. I mean to say that a great many mills are over-speeded at the drawings and the stoppage can be greatly reduced by slowing the frames, and allowing the tender to get around to the run-outs before the frame stops, thus cutting down the stoppage and increasing the production, by keeping the frames running.

I agree with "Wash" as to the sliver being slackened between the front steel roll and calender roll, and also as to having the holes in the trumpets the same size, not too small.

I would suggest that "Contributor No. 19" experiment with 1,050 r. p. m. on 7 x 3½ frames, following this rule in the experiment: Use a multiplier of 1.3 times the square root of the hank for twist. $1.3 \times \sqrt{5.80}$ hk. $= 3.13$ turns per inch for twist. Then follow this method and change 3.13 to read 31.3 and call this lays per inch required on the bare bobbins. Find a rack gear to let the tension out properly according to the diameter which 31.3 lays requires, and make sure that the exact gear is found that handles the tension properly.

Now the summary of this situation is as follows: Pickers according to the suggestions in the December, February and March numbers of COTTON by "A. B. C. (R. I.)"; picker lap, 16 ounces per yard; card draft near 150 inches; card sliver near 45 grains; doffer speed, 9 r. p. m. if possible; licker-in set to 7 gauge. If a 45 grain sliver is used from the card the first drawing sliver should be 47 grains; the second drawing 49 grains; and the third drawing 52 grains. The slubber hank roving should be .75; the intermediate roving 1.70; and the fine hank roving 5.80. The speed of the slubbers, 12 x 6, should be 575 r. p. m., the twist and lay 1.3 times the square root of the hank roving. The speed on the intermediates should be 860 r. p. m., twist and lay 1.3 times the square root of the hank roving. The fine speeder speed should be 1,050 r. m. p., twist and lay 1.3 times the square root of the hank roving.

The result of this will be five teeth of twist out of the fine speeders, with less waste and more production.

I hope "Contributor No. 19" will make an experiment along the methods outlined in this letter, and give us the benefit of the results he gets through the Practical Discussion Department of COTTON. Tom (Mass.)

A Point on Card Grinding.

EDITOR COTTON:

On any up-to-date card the cylinder is called upon to do a greater amount of work than the doffer. The doffer must have finer wire and the largest number to the square inch in order to be able to take all the carded fibers from the cylinder. The cylinder wire is more liable to be faced for the reason that it is liable to come into contact with the flats, plates, screens and matter of a hard nature.

Of late, many carders grind the cylinder much longer than they grind the doffer. They claim that as the doffer has less work to do and as the doffer wire is much finer, it does not require the same amount of grinding. When a card

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has been grinding for 4 or 5 hours it is stopped and if the wire on the doffer bites the finger nails the band is pulled from the grinding wheel on the doffer and removed, then the card is again started and the cylinder ground until the wire on the cylinder is sharp enough to bite the finger nails.

This is a good point in grinding because it saves the doffer wire and helps to retain the working diameter of the doffer. When the grinding wheel is removed the doffer should be stopped for the reason that waste is liable to collect and cause fire. Williams (Conn.).

A Draft Layout on 12s and 20s Yarn.

EDITOR COTTON:

In figuring out the draft lay-out for 12s and 20s yarn, about one of the best methods known is that of figuring the drafts for the various machines by finding the fourth root of the total draft if four processes are being used, or the cube root if three processes are being used, and then using this root as a ratio, used in conjunction with the fourth root of the figured draft in case of four process work, or with the cube root of the figured draft in case of three process work.

We will first take the 12s yarn and using a 57 grain sliver behind the slubber will proceed as follows:

First reduce the grain sliver to hank sliver by dividing 8.33 by 57. $8.33 \div 57 = .146$ hank sliver. Now, taking for the four machines the good medium drafts of slubber 4, intermediate 5, roving 6 and spinning 10.5, we next find the total medium draft as follows: $4 \times 5 \times 6 \times 10.5 = 1260$ total medium draft. Next we find the total figured draft as follows:

$$\frac{12 \times 2 \times 2 \times 2}{.146} = 658 \text{ total figured draft.}$$

Looking at the total figured draft it will be seen that it is lower than the total medium draft and therefore the separate machine drafts will be lower than the good medium drafts mentioned, but if in figuring the draft it should be found to be higher than the total medium draft, then each separate machine draft would also be higher than the good medium drafts referred to.

We will now proceed to find the fourth root of 1260 which will be the ratio to use for that figure, and next we will find the fourth root of 658 which will be the ratio to use for that figure. Now keeping in mind the fact that the figured drafts will be lower than the medium drafts, we will proceed as follows:

First, starting with the slubber, the formula will be as outlined:

$\sqrt[4]{1260} = 5.95$ medium ratio.
$\sqrt[4]{658} = 5.06$ figured ratio.

$$\frac{5.06 \times 4}{5.95} = 3.4 \text{ slubber draft.}$$

It will be seen from the foregoing that the slubber will have a draft of 3.4 which is a very good draft. Next we will proceed to find the intermediate draft by the following formula:

$$\frac{5.06 \times 5}{5.95} = 4.25 \text{ intermediate draft.}$$

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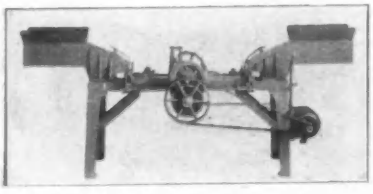

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From this it will be seen that the intermediate draft will be 4.25 which is also a very good draft. Now we will figure the roving draft as follows:

$$\frac{5.06 \times 6}{5.95} = 5.10 \text{ roving draft.}$$

This is also a very good draft for the roving frame and will give excellent results. And now we will work out the spinning draft:

$$\frac{5.06 \times 10.5}{5.95} = 8.92 \text{ spinning draft.}$$

Now taking the 20s yarn and using a 57 grain sliver (which equals .146 hank sliver) we will proceed to find the total figured draft as follows:

$$\frac{20 \times 2 \times 2 \times 2}{.146} = 1095 \text{ total figured draft.}$$

Next we will find the ratio for this figure by finding its fourth root:

$$\sqrt[4]{1095} = 5.74 \text{ figured ratio.}$$

In looking at the total figured draft it is found that it is lower than the total medium draft, therefore the separate machine drafts will be lower. With this in mind we will now find the slubber draft:

$$\frac{5.74 \times 4}{5.95} = 3.86 \text{ slubber draft.}$$

Thus it will be seen that we get a draft of 3.86 for the slubber which is a good draft. Now we will figure the intermediate draft:

$$\frac{5.74 \times 5}{5.95} = 4.82 \text{ intermediate draft.}$$

Next we will get the draft for the roving frame:

$$\frac{5.74 \times 6}{5.95} = 5.78 \text{ roving draft.}$$

Having found a draft of 5.78 for the roving frame we will now find the draft for the spinning frame:

$$\frac{5.74 \times 10.5}{5.95} = 10.11 \text{ spinning draft.}$$

Benjamin (Conn.)

On Running a Spinning Room.

Editor Cotton:

Please allow me space in the Practical Discussion Department to say a few words on running a spinning room. You know, we all don't see things alike so we should all try to be of help to one another if we can.

It has always been my policy to hold to my idea until I am shown that I am wrong, and then I am ready to come across to the other side.

The first thing a spinner should do is to get on good terms with the carder if possible. If he can't, he should then lay his case before the superintendent and try to prove his part, for a man who is a carder can't always see how some little thing might help the spinner out of his troubles, and vice versa. I am not much of a carder. You know, the Good Book says we all have a talent, be it large or small, and mine is that of a spinner, and I am trying to use it the best I can.

The next thing for a spinner to do is to keep on the good side of the shop man. If he hasn't any good side, and the spinner can't prove it, the thing for the spinner to do is look out for another job before he is told he isn't wanted any longer.

It is not good business to leave a job when it is in a hole. Stay with it until you get it on top and then leave it. For myself, I had rather take a job that is in a hole than to take one that is in good shape, but I always want to leave a job in the best shape I can.

We spinners are having better times than we did a few years ago, because they stopped us from working the young children. I find that this was the best thing that ever happened to a spinning room. I have charge of spinning and twisting and have only four 8-hour hands, and I have been here four years. I have never stopped a frame yet for want of an operative. All the young people around here are in school; the most of them are, anyway.

I try to keep the best men possible for fixers and second hands. I have strict rules which are made so they can be kept. It is better never to make a rule than to make one and let it go down. I don't believe in posting rules. I go to the help and tell them what my rules are and what I expect. Then if the rules are broken, I send for the help and take the matter up with them. In this manner it is easy to get things straightened out. I always give the help a chance and don't believe I lose anything by it. I find it a good rule to stay on the job, especially at starting time. Take the lead and the rest will follow. I think a good notice to put on the office door is "Not in, but on the job." I don't believe in leaving the room and the mill without saying something about it to the superintendent before going. It pays to stay on the job at all times and to keep the numbers on the dot. Keep the work as clean as possible and a clean floor helps the looks of a room as much as anything. A spinner should not allow broken-back roving in his room. I try to keep this in my fixer's minds, for the man who made the frame made it so all ends could run, and all a spinner has to do is to see that it runs. B. E. K. (N. C.)

A Study of the Kirschner Beater.

Editor Cotton:

The Kirschner beater, in my estimation, can never be outclassed in the cleaning processes of the textile industry. We find many mills handsomely equipped with them in every finisher picker but their intermediate and breaker pickers are laboring away with that same old two and three blade type of beaters that have been in use for years and years. If you should ask these mill men, "Why have you Kirschners in your finishers and not in your breaker pickers?," the answer would be, "I don't believe in them for breaker and intermediate machines, but I put them in the finishers to get a smoother, better prepared lap for my cards and even there I am a little 'skeery' because they fill my lap with neps, and I don't know that they are better than the blades after all for there is just as much dirt in the laps now as there was when the blades were running."

I believe that a person making such an answer is

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sincere in his utterances, in every sense of the word, but if he prepares the lap so nicely for the card, why is it that a tour of investigation isn't conducted to determine the worth of the Kirschner beater for the breaker and intermediate machines, and get the benefit of better prepared laps for the *intermediate* and *finisher* pickers *and card?* The Kirschner beater is constructed with three blades, each having a four-inch pin surface making a twelve-inch combing surface for every revolution and if run at 700 revolutions per minute, we have 8400 inches passing a given point (the feed rolls) per minute or 2100 four-inch blades. This number of revolutions (700) is the correct speed to run any Kirschner beater for perfect opening and cleaning requirements. This speed will comb any length of staple fed through any speed of feed rolls *correctly.*

Anyone who is familiar with combers can picture the tuft of cotton protruding from between the nipper knife and cushion plate immediately after the half-lap has passed and combed out the foreign matter. With this picture in the mind, a neat, thin clear lace-like fiber tuft can be seen. Now let us convey this and place it alongside of the feed rolls in any picker, and call the feed rolls the nipper knife and cushion plate, and the Kirschner beater the half-lap. It will be seen that the thin tuft is very similar to that of the combing process except that it is in the earlier stage of the process, and the needles or pins are not as close—this is the only difference if the beater is run at 700 revolutions per minute. This beater is very often discarded on imperfections simply because the speed question has been abused—the speed varying from 1,000 to 1,650 revolutions per minute.

When a carder or superintendent allows a fast speed beater to run in any of his pickers, if he will step to the fine speeders of that carding department he will find a high velocity flyer with a roving being drawn through it with twist enough to make the very finest twine he could possibly care for. But getting down to business, this 700 r. p. m. for a Kirschner beater has been adopted by the writer as the only speed that one can properly use and that will comb out the foreign matter, whip it against the grid bars, detach it from the fibers and allow it to slide by the grid bars and fall to the floor.

The 700 r. p. m. speed does all this without creating a suction that will draw this foreign matter back through the bars and into the lap on the underside of the web. This speed, if properly applied, will also carry the fleecy fibers from the feed rolls and deposit them evenly upon the cages without the aid of a fan. The four-inch blades create enough fan draft to blow the fibers to the cage after they have been removed from the beater by the cut-off knife just in front of the beater.

Now, if this beater creates enough air blast to accomplish this operation, the reader can grasp the fact that all the fan suction needed is *just enough* to remove that blast made by the beater and *no more,* for if more suction was applied the fan would immediately reach out beyond the beater for air and we would find the extra draft (that is over and above the suction of the beater) drawn from the openings behind the grid bars, etc., and that condition reinstates all the dirt the beater has removed. That is to say, the extra suction would draw the dirt that has been whipped out at the top grid bars back into the web through the bottom grid bars and the entire operation would be worth nothing at all.

If this experiment is tried out, it should be seen that the current of air in the dust cellar beneath the pickers is in the right direction (toward the chimney) for a back draft from the cellar would interfere with determining the exact speed at which to operate the fan. If very light colored dust is found about the loose joints in the glassed door leading to the cages, it signifies that the beater is creating more blast than the fan is removing—if this same powder or dust is found around the hand hole doors on the sides of the picker where the air passes from the cages to the fan it signifies that the circulation in the cellar is poor or there is an over-quantity of air forced into the space and it seeks an exit and that exit is back through the picker. Of course, there is this much about a cellar that becomes choked with air: the back draft causes the dirt knocked out at the upper grid to fall to the floor, which is a good feature, but the same back draft makes an uneven sheet on the cages which is a very bad condition to allow to exist, for uneven picker laps spells failure in manufacturing yarn.

Where it is possible to see that the dust cellar is made right first of all, then any adjustment that is applied to pickers becomes effective upon application. In my estimation a large fan should be placed in the dust chimney and all of the congestion drawn out of the cellar through a revolving cage similar to the cage in a picker. This operation would insure the removal of air congested in cellars and avoid fibers (if any happened to be taken below the pickers) being carried out-of-doors through the chimney suction. This chimney fan would carry away —evenly—at all times, air that is being forced into dust cellars that, especially on heavy atmospheric days, causes no end of trouble through unevenly spread webs on picker cages. This fan, I know, would have to be power driven and no doubt would mean quite a little expenditure for installation, but if a manufacturer can see where his picker webs are constantly insured, would it not be an investment worth while?

All individual picker dust pipes should be pointed toward the dust chimney. High speed fans mean overcongested air space in the cellar, hot and worn bearings, fibers drawn through the cages, dirt drawn back through the grid bars, cold and drafty picker rooms, and the removing of all artificial humidity from the card room proper by these same fans demanding air, which they will get from the nearest source. This last item, if gone into deeply enough, means a great many dollars expended during a year in power, trying to maintain directly or indirectly through the heating and pumping systems of the mill, this artificial humidity which is so essential in yarn manufacture. Trying to operate a mill without a humidifying apparatus is a great deal like the old gent who was quarreling with his wife from time to time and finally came to the conclusion that he neither could get along with her or without her. There are a few skeptics left in our industry who have yet to be shown about humidity's place in yarn making.

It is very essential that a proper adjustment upon grid bars be found, one that will allow the dirt to pass through and fall to the floor. When a Kirschner beater is used, the process of opening spoken of in a previous letter has

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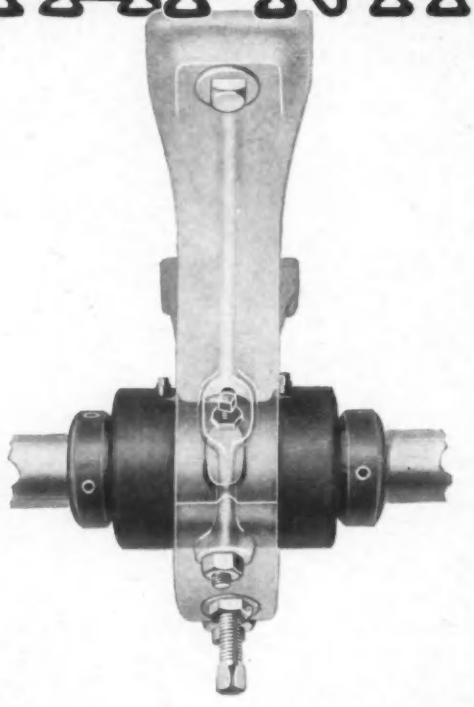

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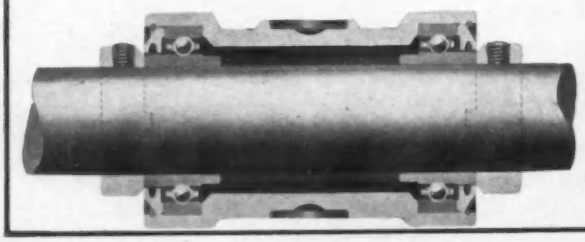

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been mastered and the air currents have been placed under control, then, and then only, will it be found that grid bars come into the class of mote knives that we have under our cards. It is then that it will be found they can be set very similar to the settings used in setting mote knives, for we find almost identically the same process surrounding a Kirschner beater as is found about a licker-in on a card, also a half-lap on a comber. These three combing instruments come into one class because their labors are similar in most every respect. A. B. C. (R. I.)

A Daily Report for the Twister Room.

EDITOR COTTON:

There are numerous ways of making daily reports, and each man probably has his own idea of how a report should be made out.

The writer started up a twisting department some time ago in a new mill that had no system of keeping a record of the production of the twisters. They started calculating the twister production by what the looms turned off, as all the spools taken from these twisters went directly to a creel behind the looms. Therefore, it can be seen that this should give good results, but the spools did not always run out at the loom. Oftentimes spools one-third full of yarn would go from the creel to the splicing tables, where they were spliced and then respooled again for the looms. Thus it may be seen that the twisters turned off a considerable amount of yarn of which there was no account made, causing a loss and bad work, as the warpers were sending in a certain amount of yarn on beams for the twisters, and the loom production showed that I was turning out less than I received. This was because of the splicing process.

The overseer of spooling and splicing was getting credit for some of my production and I was the loser of one-third of the yarn on every spool that left my department. So when the time came around to take inventory there was much confusion about production, inasmuch as one department was not turning out as much work as was being sent to that room.

We overseers were called into the superintendent's office one Saturday at noon and there we talked over the situation. Each man worked out a sample report and handed it to the superintendent who examined it closely. We were told to follow these reports for one week, then we would meet again and make any necessary alterations, should any flaws turn up.

My report covered all the frames in my room that were running and also those that were stopped, the number of frames on each brand of yarn, the number of beams on the floor and also their brand of yarn, and the amount of waste. This latter item included cleaning, oiling and sweeping waste.

DATE_____DAILY REPORT

TWISTER TENDER	NUMBER AND PLY	GRADE OF YARN	NUMBER OF SPOOLS	WEIGHT OF SPOOLS	GROSS WEIGHT	NET WEIGHT	TWISTER NUMBER
Tom Jones	20/5	Kd.P.	120	82	290	208	1
"	"	"	"	"	"	"	2
"	"	"	"	"	"	"	3
John Miller	11/2/3	C.Eg	120	82	300	220	4
"	"	"	"	"	"	"	5
"	"	"	"	"	"	"	6
Jack Rose	23/5/3	C.S.9	120	82	354	272	7
"	"	"	"	"	"	"	8
"	"	"	"	"	"	"	9
John Lang	11/2/3	Kd.P.	120	82	270	188	10
"	"	"	"	"	"	"	11
"	"	"	"	"	"	"	12
Frank Miller	23/11	C.Eg.	120	82	298	216	13
"	"	"	"	"	"	"	14
"	"	"	"	"	"	"	15
Man Rose	20/5/4	C.S.9	120	82	330	246	16
"	"	"	"	"	"	"	17
"	"	"	"	"	"	"	18

FIG. 1

TWISTER PRODUCTION REPORT

DATE_____DAYS MILL Nº5

BEAMS ON FLOOR	Nº	FRAMES RUNNING	Nº	WASTE	LBS.	PRODUCTION	LBS.
20/5 CS9	3	20/5 Kd.P.	3	Clean.	15	20/5/4 CS9	738
11½/1 Kd.P.	2	11½/3 CEg	3	Oily	6	23/5/3 CS9	544
23/1 CEg	9	25/3/3 CS9	2	Sweeps	25	23/11 CEg	648
20/1 Kd.P.	10	11½/3 Kd.P.	3		46	11½/3 CEg	660
	24	23/11 CEg	3			11½/3 Kd.P.	564
		20/5/4 CS9	3			20/5 Kd.P.	624
			17			3	778
TOTAL 3,778						OVERSEER. T.A.B.	

FIG. 2

Figure 1 shows a reproduction of the report just described. I think this is a very good method of making out a daily report, as it covers production, spindle and waste report, also the frame each person operates; the latter is an easy way of tracing bad work back to the right person, as each operative's name goes on the report with the frames he or she runs. Therefore the office is always kept posted and can see that there is not too much help in the department. Things are made simple for the superintendent, who knows at a glance just what is going on in the room, and also what is running and what is idle, also the reason why, such as repairs to the frames.

Figure 2 shows the production of the twisters. Fig. 3 is a sample of the report I send to the shipping department for stock to keep the frames of my department in operation. I make four copies of the report shown in Fig. 3; one goes to the main office, one to the shipping department, one to the overseer of the room running the stock in question, and one for my files.

These reports merely give the reader an idea of the arrangement of the frames. Also it can be seen that frame number 9 is stopped for repairs to cylinder. In the office they will know the reason why number 9 is not producing yarn. On the following day, if number 9 is still stopped for repairs, the superintendent will, on his trip around the room, inquire why and where the cylinder is held up, trac-

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STOCK REQUISITION

DATE ..... DAYS MILL No 5

YARN No	BRAND	No ENDS	LEESE	BEAMS REQUIRED	
20/1	Kd.P.	300	5x5	21	
23/1	C Eg.	440	11x11	35	
11½/1	Kd.P.	360	3x3	16	
20/5	C59	480	4x4	7	
				79	TOTAL
			OVERSEER		T.A.B.

FIG. 3

ing it to the machine shop, thus speeding up the repairs.

I am sure the readers will agree with me that this improves the working conditions and the production, the men higher up can see at a glance that there is nothing slipping by the overseer.

Figure 3 shows the lay-out of the beams required to run the room for 24 hours. It is not a correct number of beams, but just a rough lay-out, the object being to get the arrangement on the reports. I send one report to the shipper, one to the main office, one to the department making this yarn and keep one on file. Therefore, if I order 125 beams all told for one day and the shipper fails to give me the amount required, I call up the department making the yarn and they must see to it that I am kept running, just as I must keep the weave room going. Then, if there is a hold-up of the beams before they reach me, the shipper hears from the superintendent as it is evident that it is impossible for me to run my room without beams.

The office had one pad of sheets printed with reports similar to those shown, on a larger scale, of course, the lay-out being the same. T. A. B. (Mass.)

Roving Twist and Breaking Strength.

EDITOR COTTON:

I wish to ask the following question through the Practical Discussion Department of your valuable magazine:

Does it help the running of the spinning to place more twist in the roving? Which would give the best results as to even yarn, strength of yarn, and the running of the ends of spinning, 10 per cent over standard, 20 per cent over standard, or 30 per cent over standard twist, on, say, 3.50 hank roving, being run single on spinning making 23s yarn? The stock being used in this case is from a mixing of from middling to strict middling cotton with ⅞ to one inch staple. Ted. (Ga.)

EDITOR COTTON:

"Ted (Ga.)" would probably be interested in actual tests made in a North Carolina mill, in answer to his query as to how the twist in roving affects the breaking strength, evenness and running of the yarn.

This particular mill had had trouble with the breaking

strength of the yarn and all means were resorted to in an effort to increase this very important factor and changes were made in beater speeds, beater settings, licker-in settings, drawing rolls, etc. Numbers of these things did improve the work to some slight extent. Yet the break was still nothing like it should have been with the grade and staple of cotton which was being used.

As a last resort, the superintendent was induced by the writer to reduce the high twist in his roving and the following figures tell the story far better than could be penned in words.

In running slack twisted yarn, the size of the bobbin, uniform diameters, lay of roving and tension are all to be reckoned with. There is no question but that slack twisted roving runs better in the spinning—makes better yarn which is not only stronger but more uniform.

Table I

Date of Tests: Jan. 21, 1921. Blank Mill.

Soft Twisted Roving

Twist mult. 1.332

4.44 hank roving used. Twist gear 22.

No. 24s yarn spun Frames—Whitin Speeder.

Bobbin No.	Yarn No.	Breaking Strength.
1	23.26	72 lbs.
2	22.73	75 lbs.
3	24.69	69 lbs.
4	22.99	73 lbs.
1	23.81	76 lbs.
2	23.53	69 lbs.
3	24.10	70 lbs.
4	23.26	70.5 lbs.
1	24.39	67 lbs.
2	22.99	72.5 lbs.
3	24.39	66.5 lbs.
4	23.81	71.0 lbs.
1	23.64	75 lbs.
2	24.10	66 lbs
3	23.26	70.5 lbs.
4	——	——lbs.
Average	23.66	70.89 lbs.
Maximum Variation	1.84 Nos.	10.00 lbs.

Table II

Date of Test: Jan. 21, 1921. Blank Mill.

Hard Twisted Roving.

Twist Gear on

Roving Multiple of 1.65 Whitin Speeder 18

4.44 hank roving used. No. 24s yarn made.

Bobbin No.	Yarn No.	Breaking Strength.
1	23.81	68 lbs.
2	24.39	62.5 lbs.
3	24.69	63 lbs.
4	24.69	65 lbs.
1	24.39	69 lbs.
2	23.81	62 lbs.
3	22.73	72 lbs.
4	24.39	60.5 lbs.
1	25.00	71 lbs.
2	23.81	65.5 lbs.
3	23.81	65.5 lbs.
4	23.50	63 lbs.
Average	24.08	65.6 lbs.
Maximum Variation	2.27 Nos.	12.5 lbs.

From Table I and Table II a comparison can be made as to just what effect the twist in the roving produced. Not another process was altered in the slightest degree and these results are apparent and figures and facts are after all the convincing argument, and these figures tell us that about 10 per cent or less is the maximum amount of excess twist that roving should carry.

The foregoing was for double roving in the spinning and for a comparison of single roving on 20s yarn the following table shows again this same increase for it is to be reasoned that the less twist, then the more adaptable the roving is to be uniformly drafted out.

Table III

Date of Tests: Jan. 21, 1921.

Blank Mill

20s Warp Yarn.

Soft Twisted Roving Twist Mult. 1.332			Hard Twisted Roving Twist Mult. 1.65		
Bobbin No.	Yarn No.	Breaking Strength	Bobbin No.	Yarn No.	Breaking Strength
1	22.73	92.5 lbs.	1	20.41	85 lbs.
2	20.00	78.5 lbs.	2	20.83	79.5 lbs.
3	19.05	85.5 lbs.	3	20.41	85 lbs.
4	19.61	85 lbs.	4	18.87	88 lbs.
1	19.23	85.5 lbs.	1	20.20	82.5 lbs.
2	20.00	83.5 lbs.	2	20.62	80 lbs.
3	19.05	86.5 lbs.	3	20.83	76.5 lbs.
4	20.00	89 lbs.	4	19.61	82.5 lbs.
1	20.63	84 lbs.	1	20.00	90 lbs.
2	20.00	78 lbs.	2	20.41	82 lbs.
3	19.61	87 lbs.	3	20.41	84 lbs.
4	20.00	87 lbs.	4	19.61	88 lbs.
Average	19.99	87.5 lbs.	Average	20.18	83.5 lbs.
Maximum Variation	3.60	14.5 lbs.	Maximum Variation	1.99	13.5 lbs.

Contributor No. 50.

Capitalizing The Weaver.

Editor Cotton:

In a weaving mill the life of the plant is the weaver and the product of the weaver. To have a satisfactory product there must be good weavers. Having a complement of good weavers should mean a satisfactory product, but this is not always the case. Therefore this article has to do with what happens between the weaver and the product wanted. It is this difference that counts—the difference between the satisfactory product of the weaver in the one case and the unsatisfactory product in the other case. What are the reasons for the difference?

In taking a look around among our various mills we find there are a great many different combinations. They vary all the way from the excellent conditions to the very poorest of conditions. We must first consider what constitutes excellent conditions for a satisfactory production of weaving. They are as follows:

Good management. First class weavers. Excellent machinery. Competent fixers who are also courteous. Class of goods well adapted to the machinery. Well made yarns. Proper distribution of yarns. Comfortable light, heat and ventilation, also clean, cool drinking water. Convenient arrangement of machinery, closets and trucks for the loom

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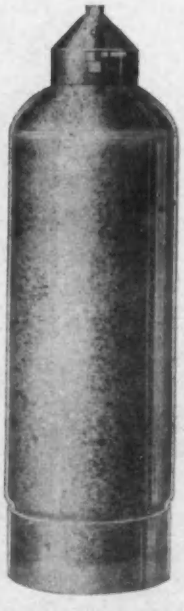

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product as it is taken off of the loom. A good system of oiling with good oil. Splendid system of yarn preparation for the looms. An equitable system of prices for the piece work. A steady and well adapted speed. An adequate system for humidifying and filling conditioning. Lastly, all that goes with the welfare system counts in the deal. This includes housing, amusements, religious activities, vacations and all health problems, combined into a carefully organized welfare system.

In this list is a couple of dozen very important matters which offer every incentive for the weaver to deliver liberally of a good product. It is the weaver's working capital which is provided for the benefit of a good product. Without this capitalization behind the weaver, the product will suffer in proportion to the want of it. Every one of these items are so closely related and interwoven that not one of them can be radically wrong without damaging the entire system. It is, therefore, the important part of good management to keep all of these links in the system properly welded together. One weak link will spoil the strongest chain, and this fact applies in the trade of weaving the same as with a real steel chain.

To illustrate the point more clearly, let us suppose that the yarn is poor, or the machinery antiquated and all out of order, or that the fixers are poor, etc., what can good weavers do in case any one of these items in the list is all wrong?

The capital investment behind the weaver should be properly apportioned according to the requirements of each one of the things mentioned in the list. To show the value of my claims, let's take a sample mill where everything is all right except the proper distribution of the warps and the filling, also the rolls of cloth as they come off the looms. The weavers are all especially good weavers, and everything else is fairly supported. But in this mill the trouble is with the apportionment of and distribution of the filling, carrying away the cloth from the looms, also the humidifying of the atmosphere in the weaving department, and the conditioning of the filling. Weavers get their own filling for their looms. They also carry their rolls of cloth to the cloth room. This mill uses mule cop filling purchased and shipped to the mill in cases. As a result of the weavers getting their own filling, the filling system was in a deplorable state. There were cops on the floor everywhere. The filling was not packed into the loom supply boxes as it should be. As the filling in the large cases were unpacked, the balance became disarranged and tossed about, and worse than this, the filling was not conditioned. All this caused an immense amount of waste. There was no humidifying system in the weaving department and this caused the warps to run poorly.

In addition to this, there is another very valuable matter to consider, and that is the time consumed by the weavers in carrying filling and cloth around. The loss in this way not only caused a loss of weaving production, but also caused poor work on the looms which were left running while the weavers were busy with the filling and cloth-carrying errands. Under the best of management the scheme is to utilize the weaving skill for weaving only, and then to employ unskilled labor to do the filling and cloth-carrying errands. This done, the weavers are kept busier at their looms, and thus produce more work and better work.

And, in this connection, the person or persons who unpack the filling from the large shipping cases can also repack it nicely into the loom supply boxes and then properly condition it before supplying the weavers. The weavers are then in possession of first class filling with which to make first class cloth. The rolls which come off of the looms are delivered to the cloth room by special trucks, the weavers giving all of their attention to the weaving of perfect cloth.

In passing it can be mentioned that the difference between the old and the new state of things in this mill is 10 per cent more production and 5 per cent better quality. The extra help put on to take care of the filling and the cloth more than pays for itself. Without this help the mill thought it was saving money. It did show a saving on the pay roll, but they were losing in dollars and cents otherwise.

And so it is down through the rest of the list of matters which are always in favor of the weaver.

In some mills the fixers are lacking in courtesy, or some fixers lack real ability, both of which make it mighty uncomfortable for the weavers who have to put up with it, at least until the matter is shown up and straightened out.

Careful attention should be given to the important matters relating to the temperature, light and ventilation, also the humidity of the weaving department. Poor lighting, poor air and either an over-heated or over-cold room produce a serious handicap for the weavers. Plenty of cool drinking water, convenient sink rooms and clothes lockers, all are worth while. Everything that can be done for the personal and bodily comfort of the weaver should be considered, as it means more steady working and more and better cloth all the time.

An even, well-adapted speed for each style and width of loom must not be over-looked. Uneven speeds and ill-adapted speeds are serious defects in the capitalization of the weaver.

Of most essential importance are the weaving prices for the various styles of goods. It is not difficult for a careful cost finder or textile mathematician to compute weaving prices that are fully equitable, and yet in some mills some styles are over-paid while others are under-paid. While, as a rule, a weaver does not pretend to be able to figure prices, he makes very telling comparisons. He knows the better paid styles as well as the poorer ones. What he wants is to earn as much on one style as on another, but he can almost always note the difference, if there is any.

In computing weaving cloth prices the following points must be considered: ends per inch of warp, picks per inch of filling, speed of the loom in picks per minutes, width of the goods, and plain or fancy weave. In the case of fancy weaves the number of harnesses and shuttles must be figured in. Some mills pay by the pick. Jacquard work requires very careful computing, as well as all special patterns.

It pays to capitalize the weaver in full, and to see that the money set aside for good weaving is properly apportioned in all essentials pertaining to the welfare of the weaver. Production (N. Y.)

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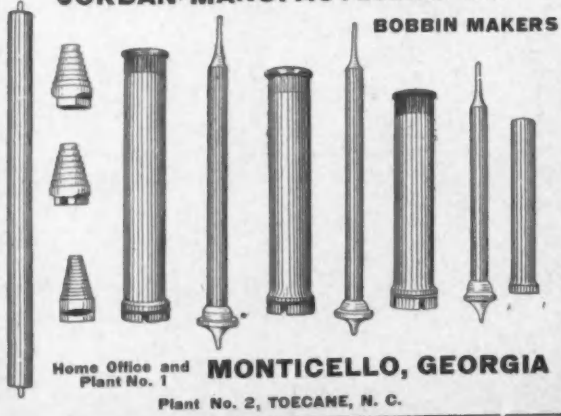

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Assisting the Picker Evener.

Editor Cotton:

Following the suggestion of "W. H. H. (Ga.)" that some of Cotton's readers comment upon his discovery of the evener roll acting irregularly upon the web, and the unevenness caused in the finished lap, as explained in the March number, I will take this occasion for my comment.

His discovery, in my estimation, is a very substantial one, and he has truly stated the trouble which would exist under the variation in the thickness of the doublings under the evener roll and between the evener roll and cages, namely: Any action of the evener roll, because there is a distance of three inches between the evener roll and the feed rolls, with a draft of four, gives twelve inches of heavy or light web at the cages or in the finished lap. Making a positive drive for the feed rolls would no doubt clear away, to a certain extent, any doubt as to unevenness in the lap as far as that goes, but we would find ourselves up against the same problem in another place, for if the evener rolls and feed rolls were separated, the feed rolls driven positively and the evener rolls controlled by the evening equipment, we would find a slack and a taut condition between the feed rolls and the evener roll, and the final result would be the same uneven twelve inches of web upon the surface of the cages or screens.

If, therefore, we find ourselves no better off than we were previous to our investigation, the only thing left for us to do is to try to eliminate the unevenness previous to the process of evening by an evener roll. There is but one mill which I have ever seen where the trouble of uneven yardage was extinct, but at this mill that condition never would have existed had we not gone back to the beginning, to the opening room, and arranged the adjustments and settings in the opener, and in turn in the breaker, intermediate and finisher pickers as a group. Had we not done this we could not have had the conditions surrounding the eveners on the intermediate and finisher pickers that we did.

After we had the trouble of uneven yardage in our laps that was intensified by the evener equipment on our pickers, we arranged the conditions (which I will try to explain later) with one point in view, and that was if we would have even yardage in our laps our evener or cone belts must stand in one position upon the cones, but still there must be that freedom of the evener to allow the cone belt to be moved at the will of the evener should the occasion demand.

This we accomplished after a time and the result was an absolutely even yardage, as "W. H. H." had in mind by his suggestion of making the feed rolls a positively driven factor. It will be seen that by creating conditions that would cause the cone belt to run in one position upon the surface of the cones, was equal to a positive drive for the feed rolls, together with an evener attachment when one was needed.

Moreover, the writer is convinced that originally the evener motion was applied to a picker for no other purpose than to take care of any thinness that would be caused in the doublings by the picker tender allowing one lap to run out—or a loss of 25 per cent in the doublings on the apron. But since then, the construction of our modern pickers has been so changed that the unevenness in the yardage is being caused, inch by inch, by the faulty construction or design of modern hoppers.

If the reader will investigate the surface of the spiked apron both in the opener and breaker hoppers he will find places upon the surface of the apron with no cotton upon them, while beside the bare place there will be a very large flake fastened to the points, which if allowed to pass the evener apron or evener roll at the top of the hopper, will proceed on its way only to be one of the many heavy places and the bare space will be the cause of the thin web. The heavy bunch will lift the evener roll and the thin place will drop the evener roll causing the unevenness upon the cage.

I would like to have "W. H. H.," and any other readers experiencing the difficulty in hand, try the following experiment: Place a gravity back or bars in the hopper, in place of the bottom apron, at such an angle as to assure a constant pressure of cotton against the spiked apron, and it will be found that the evener rolls will become quiet and assist the evener problem tremendously. In an article headed "Improving the Opener Hopper" in the February number of Cotton, "A. B. C. (R. I.)" gave an exact description of the type of hopper to which I refer, having evidently had in mind practically the same thing I have had experience with.

If the foregoing suggestions are followed out for experiment, I strongly believe that the yardage will become nearly perfect. If anti-friction bearings are applied, this too will greatly assist the evener in its action if the occasion arises to demand. We all acknowledge that the evener isn't true to its duties, but without it our sizings would be all wrong.

If your correspondent will make all conditions leading up to and surrounding this doubtful member, and assist them all with sensitive bearings, his results will be perfectly satisfactory. Tom (Mass.)

Slipping Cone Belts.

Editor Cotton:

I notice in the November number of Cotton that "T. A. D. Ga.," in his practical letter entitled "Dressing Cone Belts," is trying to throw a scare into our camp. This letter reminds me of a story of a senator who introduced a bill for the regulation of the speed of automobiles. A certain man had invented a device which would display a green light when the machine was running under 30 miles an hour, a red light when the speed was over 40 miles an hour, and when the machine was running 50 miles an hour or over, the inventor had a music box under the seat that played "Nearer, My God to Thee."

I hope T. A. D. read my article in this same number under the heading "A Mill Experience." Please note the second paragraph, which states "just to make things interesting, after making tests from the suggestions, commend the writer or bring him to the 'mourner's bench' as the results seem to warrant." Who ever heard of a belt slipping in dry weather? Belts slip on a damp day. When all this happened, T. A. D. was an operative on roving frames, so we take it for granted that at that time he had little or no knowledge regarding the winding-on.

The cones of a cotton roving fly frame are its most essential feature, as upon them depends the perfect winding of the bobbin, and the more accurate their outlines, the

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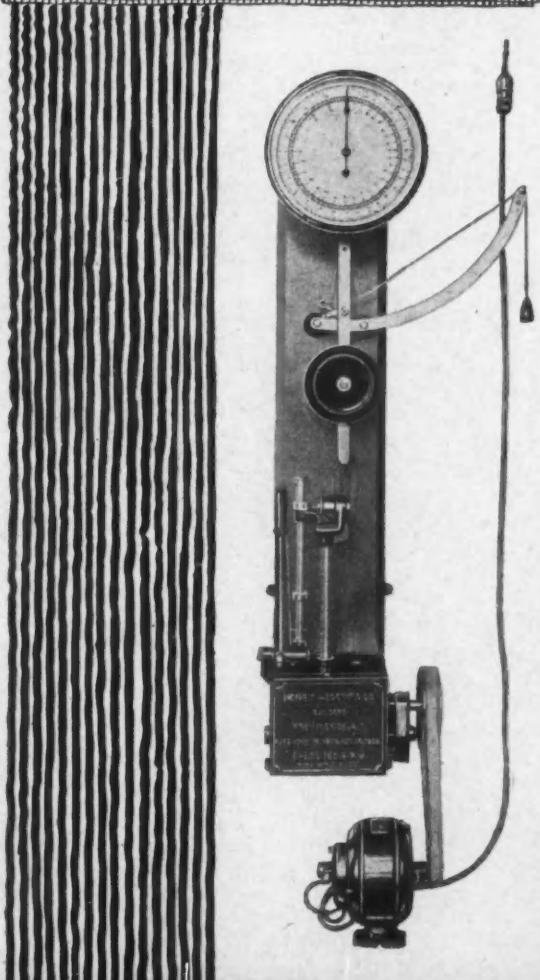

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nearer perfect the winding and the nearer perfect the winding the better the roving that it produces. The good working of the cones depends upon a piece of belting which is considered one of the most important of all the minor belts in a cotton mill. And why? Consider the spindle and flyer as standing still, and assume that the roving will draw through the flyer without twist and without breaking. It will be seen that the surface speed of the bobbin must equal the surface speed of the front roll, which is constant. This continues for the first layer upon the bobbin, at the end of which time the revolutions of the bobbin is reduced in the right proportion to keep the surface speed the same as the first layer, and so on until the bobbin is formed.

As each layer is being put upon the bobbin, the cone belt is working upon certain diameters of the cones to produce the right outline of the cones, each layer of a bobbin of roving must be considered separately and the diameters of the cones figured for that layer alone. Cones are really so many separate pairs of pulleys connected together in a continuous string.

In my article "The Value of Belt Dressing" in the September number of Cotton I speak of "the uniform tension." If a new cone belt is put on and no dressing applied, in a short time the belt will slip when the frame is started. This will bring the belt against the shipper and will curl the side of the belt to such an extent as to reduce its working surface on the cones. This will, of course, cause the frame to run slack and if the rack gear is changed instead of applying dressing, the frame will run under such conditions, but will not run well, for the reason that the bottom cone is unsteady due to the friction. Let us suppose that we apply belt dressing when the set is one-half full, the only damage that could possibly occur is that the frame would run a little tighter. In such a case, we could change the rack gear and let the frame off one tooth on the rack and the trouble would be over. But this is for extreme cases.

As a rule, a slack cone belt will run when the frame is up to speed. It gives trouble only when the frame is started.

In the condition which T. A. D. describes, the carriage was neglected. No doubt the slides were dry and clogged with dirt, and may not have been oiled for months. The man in charge might have taken things easy, only to be uneasy later on. I assure the readers of this department that they need not fear using belt dressing on their cone belts at any time during the set. Try it. The cone belt described in Fig. 3 in T. A. D.'s letter is an old proposition. I used such a belt on the old Higgins fly frame as far back as 1890. Wash. (Conn.)

A Knitting Question and Answer.

Editor Cotton:

Are the heel and toe of a seamless stocking made in the same manner? How are they made? W. C. (Mass.)

Editor Cotton:

Replying to the inquiry of "W. C." I think the following answer will be satisfactory:

The heel and toe of any one seamless stocking are made alike. The difference comes in the arrangement of the fabric of which they are composed. The heel fabric makes about a quarter of a turn, while the toe fabric makes one-half a turn.

In general, all heels and toes, for seamless stockings, are made by first raising one-half of the needles out of action. That is, by lifting the needles, with the loops still on them so high that the butts cannot be acted upon by the knitting cams. Then, the needles, or the cams, do not rotate, but reciprocate, and for each course, one of the needles in action is lifted up out of action. These needles are lifted on opposite sides for successive courses. When only one-sixth of the total number of needles remain in action, or, when two-thirds of the needles (of the half left in action) are lifted up out of action, (one-third on either side), this narrowing ceases and the needles are replaced in active position, one for each course. When all of the needles, which were in action at the beginning of the heel, are replaced in action, the half (of the total number of needles) which have been out of action all of the time, are drawn down, the reciprocation stops and the machine begins rotating again. M. R. G. (Mass.)

Another Picker Room Problem.

Editor Cotton:

We have three processes of picking making a lap on the breaker picker weighing one pound to the yard; the lap on the intermediate weighs 14 ounces to the yard, making a 41½-pound lap with one pound variation on either side. The finished lap weighs 41½ pounds, 14 ounces to the yard, and we allow 8 ounces variation on either side. Our card sliver varies sometimes as much as 10 grains. I would like to know how much trouble other picker room men are having with variation, and how much the card sliver varies under such conditions. We are running colors and white and the colored sliver generally runs to the heavy side.

A. L. (Ga.)

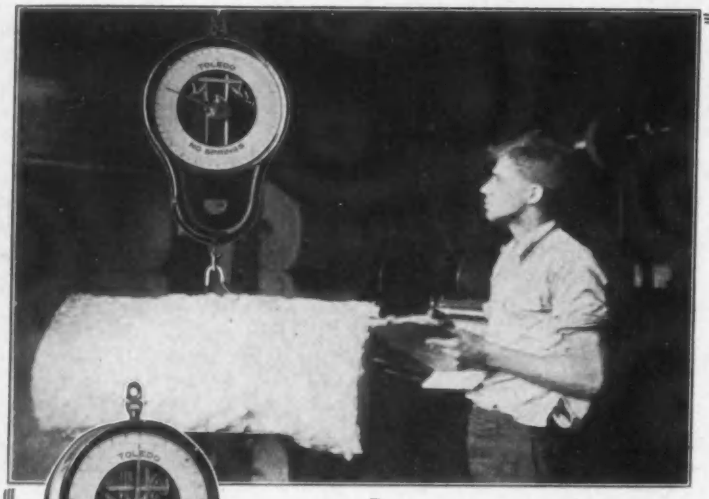
Oiling Spindle Taps.

Editor Cotton:

I have recently had the pleasure of visiting a few mills in nearby states and the thing that impressed me most on these visits was the condition of the fly frame spindles. In every mill visited—with one exception—I noticed when doffing the fly frames it was necessary for the tender or doffer to use one flyer to knock another from the spindle. What a condition!

One carder blamed the builder; he claimed the spindle top was not properly made to fit the boss of the flyer. When the next frame was doffed, the doffers were told to leave on the spindle every flyer that could not be removed readily. The carder and I cleaned each boss, and also the top of the spindle, and added a little oil. That acted like magic, for every flyer could then be removed easily.

Flyers stick to the spindle for the reason that they have contracted a certain amount of rust that is not detected by the naked eye. Every cotton mill manager should insist upon all flyers being removed on the first doff every Monday morning and the top of every spindle oiled. If a frame doffs three times a day, we have $3 \times 5.5 = 16.5$ per week. $16.5 \times 52 =$ nearly 858 doffs per



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year. Now to be convinced how serious it is to neglect the spindle tops, the reader can take a dry flyer and remove it from the spindle 858 times. When this is done I am sure he will agree with me that the spindle tops should be oiled. However, many carders have confessed to the writer that they had no idea when the spindle tops had been oiled. Wash (Conn.)

Educating an Understudy.

Editor Cotton:

I have read with much interest the article by "L. W. B. (N. C.)" in the October number of Cotton. It recalls many visions to my mind of the days of the '90s, when we were up against it for jobs, and also trying to get a decent wage out of what we were doing. I consider his article worthy of due consideration, not by the beginner alone, but by the older ones as well, for it brings to mind the importance of teaching the men under you, for that's the only chance they have, or at least the best chance, and besides, it makes the job so much easier for the overseer to run when he teaches his men all the duties that lie in their respective positions, because when the different jobs are in good shape, the overseer's job is in good shape.

The writer began his textile work in the fall of 1891, when many of the countrymen in my section resigned farming life and went to a mill that had been burned down, to assist in rebuilding it. I was the oldest chap of a family of ten children and was then 15 years of age. During the course of the construction of the mill, the president said to one of his older employees that he was sorry for that family (meaning ours), and that he would give the old man $50 to help on his moving expenses if he would move to another mill, for he did not think that he could give them work enough to live on until the mill was completed. By some means this remark reached my father, and thence it came to me, as I was the oldest kid, and I told my father that I thought we could get along as the next boy, who was nearly 14, and I could keep us in clothing, if my father would do the gardening and plant some wheat and corn, we could fatten a pig or two, until the mill could be built and we got to working in it. My father had a mule and a cow, so we went to it.

My brother and I were on the construction job every day, but the only job we could do was to carry the water and other light materials in and about the building, but we stuck to it and managed to keep ourselves in regular employment until the mill was finished; then we got work on the inside. At that time we received 40 cents a day for our work. The thought of what the president had said about us seemed to put the "pep" into us and inspire us to make our own way, and we did. When the mill was started up, the same "pep" was still in us, and we set to work to prove ourselves, to show we had some ambition, and to make good in the mill business. I went to work in the spinning room and learned to doff, tie on bands, and almost everything that it takes to run a spinning frame. Then I was transferred to the twisting room where I learned to run twisters, reels, etc. I was next put in the card room, where I was the roustabout boy from the warehouse to the speeder, card grinding to second hand.

Everyone was kind to me, but I noticed that a few had a scornful look for me, but I went about my work as best I could, and did everything I could for everyone to make his or her work run good. But I could see that there were others who wanted my job, and that put me to thinking as to what was best for me to do. I had been doing all the sizing of the slivers in the room and had kept the time, for the boss carder did not have enough education to keep his own time, and I could see that he was getting uneasy. Still I was as loyal to him as I could be, and at the same time I was teaching a man of whom he thought a lot all there was about my job. One day I got an offer of a small card room that paid $1.50 a day, and as that was pretty good for those days I moved off, and in the new place everything went well with me. I made good work and ran the job well. One day the superintendent brought a young man to me and said he wanted me to take an especial interest in him, that he was a fine fellow, and asked me to do all that I could to make something out of him. He was well experienced in the card room and I did not have much trouble in handling him where I needed him. However, as time went on I noticed that the two of them were out together a good deal at nights, and one morning the superintendent came in "wrong side up" and everything went wrong. I thought I could see it, so I told him to pay me up, which he did and the young fellow got the job.

Then I landed another job helping to start up a small card room with new machinery, and my job seemed to be teaching some other man to take my place, first it was teaching a card grinder, then a frame fixer, and then I was made a second hand, but on this job, as on the rest, I soon found out that as the job began to get going good, there were others who were put to the front. It was rather disagreeable for me, and as I knew of a large mill that was completed and for which the machinery was being shipped about that time, I wrote to the management for a job. Their reply was for me to come ahead, that they would take care of me, so I called for my time, and the man I had last taught got the job I was on.

My new job was in a 60,000 spindle mill. There I belted up everything in the card room and ran it as second hand, and, as usual, I taught another man "especially" to run the second hand's position, and after a short time, when everything was going good, I was asked to resign, but this time I was transferred to another of their mills as overseer of carding. I ran this job a few years, and then, as usual, my second hand, whom I had taught to run the job, got my place, and I was transferred to another of the company's larger card rooms. I stayed at this place several years and brought up another man to become overseer. In time he got that job, and I landed a bit higher up in the position of superintendent of another mill.

It pays to always teach your men all you can as it helps you that much more, and you never can tell what is in store for you. The job is, as I have said, much easier for an overseer to run when his men are taught to bear the burdens, and to feel the responsibility of what there is in an overseer's job. There are not many mill officials today who will allow an under-employee to undermine an overseer, if the overseer is on the square with everyone; in fact, the officials now-a-days take especial pride in an overseer who does teach and help his men and who takes an active interest in them, for the men are that much more efficient and ready to run the room in case the overseer is off for a few days, or gets another position. Then besides, it shows

loyalty, and a man who is loyal to his position is generally a good, agreeable overseer, for he is upright and is running the job on the square, and is doing unto others as he would have them do unto him.

Working under this rule, the overseer will show this same spirit among his help, and they will all take to him, and good results will follow. Never be afraid that someone will beat you out of your job. That time, in my opinion, has passed. It is always best for the mill for us to teach the help, and the officials are always on the look-out for an overseer who will promote the knowledge and welfare of his help. It may look like it is a long way off, sometimes, but the reward is sure to come.

The depressing times that seem to confront us will cause more young men than ever to sit up and take notice of the future and what it holds in store for them, because they can see that wages are going down and that there is no way to stop it except to qualify for a better position. For four or five years it has been so that they did not think very much of the future because they got good wages for most anything they did, but a readjustment period has arrived and they can see it as well as the overseer can, and they too know that they have been making almost as much, in some instances, as the overseer.

While wages were so high I once had a traveling man in my office, and during the conversation he said that he was very much amused a few days before up at such and such a mill, where the manager met a doffer out of the mill on pay day, mad as a hornet. The manager asked, "What's the matter, kid?" The doffer replied, "Look at my ticket and you'll see what's the matter." The manager took the ticket and glanced at the number and said "Sonny, that's not your ticket; it's the overseer's." And the boy replied, "That's all right, if you'll make it good."

In a sense, the overseer has not had as much advancement as he should have had, but his day is coming now while this readjustment is on, and it is to be hoped that he will remain at a higher salary than previously. The mill executives must use discretion and not get out of proportion going down as they did while they were going up.

I believe it does good for a fellow to write for such a paper as COTTON, which has such a wide circulation and which reaches so many mill men. It does all of us good, I am sure, to read of the other fellows experiences, because we can get so much good out of them and get things off our minds, as well as to receive something from the other fellow. It opens up one's thinking capacities and gives him a new spirit and more energy to go about his daily routine of work. We all get in the rut sometimes and a word through COTTON often does a wonderful work. It is a way by which one can get rid of his troubles, and at the same time receive encouragement and enlightenment by reading and keeping posted on what is being written in COTTON by its contributors, which is the best material that I can find in looking through most of the textile papers.

T. A. D. (Ga.)

Superintendents and overseers, don't forget that the annual convention of the Southern Textile Association is to be held in Aalanta, Ga., on Friday and Saturday, May 13 and 14. An interesting program is being arranged by the officers which will include a practical discussion of technical subjects. Make your arrangements to attend this meeting!

The Duties of a Section Man.

EDITOR COTTON:

I give below my opinion of the duties of a good section man, and shall be glad to have you publish this in the Practical Discussion Department of an early number.

A good section man should run his own job and let the other man's job alone. He should stay on his job, take a real interest in it, and feel it is his duty to keep his job in first-class shape. When he finds a frame making too much noise he should stop right then and fix it before the foreman finds the trouble and tells him to fix it. If a foreman must find every frame that needs repairing he has no need for a section man. If there ever was a dead-beat in a cotton mill, it is the section hand who only looks for pay day and Sunday.

If a section man finds a spindle that is untrue, he should fix it as soon as he finds it and not wait until the next day to do so, for if he so procrastinates, he may have several bad breakdowns and then he will not have time to fix it and the end on that spindle will not run, causing a loss in production.

A section man should look after his spinners and see that their sides are kept clean. When a set of sides gets all mussed up, the spinner can't keep them straight, and worst of all it will cause gouts in the yarn. If a section man finds a spinner with whom he can't get along, and who stays away from her work, he should try to reason the matter out with her and to show here how much better it would be for her to go ahead and do what is right. If that doesn't do any good, he should report the spinner to the foreman and have her discharged.

Oiling will receive the careful consideration of the good section man; he will keep all his frames well oiled, for oiling is one of the most important things in a spinning room. When a frame goes very long without being properly oiled, the work begins to run poorly. The section man should keep every end in his section in as nearly perfect condition as possible.

The rolls should receive the special attention of the section man and he should see that these are well oiled and cleaned. If the rolls are not properly cared for, the yarn will not have the proper strength and this will make trouble for the overseer.

A section man should not get the habit of talking to his help while he is on the job, unless he is telling them something about their work.

And last, but not least, a section man should have absolute control over himself. He should not lose his head every time he gets a little worried. If he does, he will not be of much service to himself or to the company.

I. C. (Ga.)

Evidence that the chemists of the National Aniline and Chemical Company, Inc., appreciate the requirements of cotton dyers is shown by the production of a new type designated "National" Erie Fast Orange C G, which has just been put on the market. This new dye is claimed to have ready solubility, good fastness to light, washing and alkalies, while its resistance to perspiration and organic acids is excellent. It is a level dyeing color. Dyers of wool and cotton, and silk and cotton mixed fabrics, will be unlimited in the use of this new dye by reason of its property of not staining either silk or wool.

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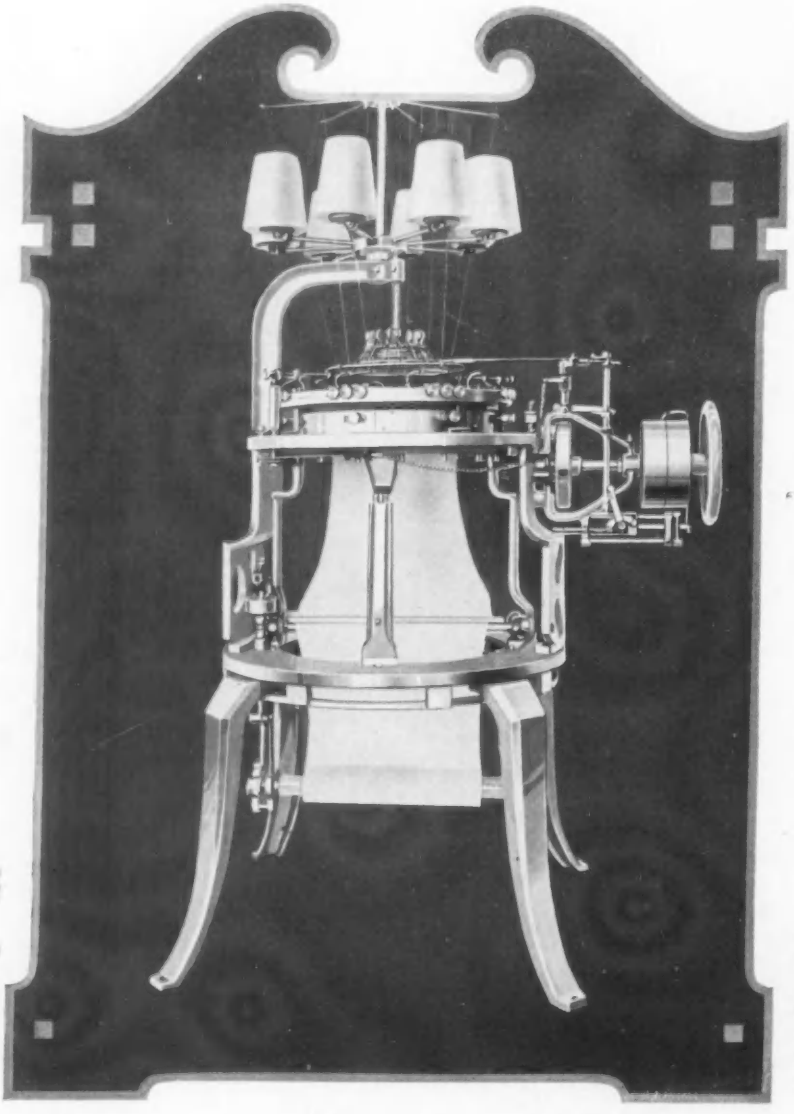

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The Knit Goods Market

Hosiery in strong demand as to more exclusive lines, and lagging in others; light weight underwear mills employed to capacity on a continual inpouring of small orders; manufacturers and jobbers feeling their way with reference to heavy weight underwear, and sweaters active, for spring and summer, but lamentably inactive so far as relates to garments for winter, describes conditions as they existed in the knit goods market toward the close of March.

The sensation of the month was the auction sale of an accumulation of about 5000 cases of men's and women's mercerized and lisle hosiery of the Ipswich (Mass.) Mills. The sale took place on the 8th, at the rooms of Wilmerding, Morris & Mitchell, New York, and attracted a throng of buyers, principally retailers and smaller jobbers. The prices obtained were in the main very satisfactory to manufacturer and jobber. It had been feared new low values might be established in the dumping of approximately 275,000 dozens on the market in a single day. As a matter of fact, some lots of women's mercerized sold at and about the prices jobbers had been paying mills in the regular order of business.

A few dealers more interested in low prices than market stability had undertaken to exert a bear influence, in the circulation of groundless reports that another sale or two was in contemplation. It became apparent soon after the sale started that this move for causing demoralization was having little or no effect, for prices ruled so high that a number of intending buyers quitted the auction room without taking even a few cases. One establishment had instructed its buyer to pay $1.75 a dozen for women's 240 needle mock fashion mercerized. Several lots brought just one dollar more, while some others went at considerably less.

Retail dealers were conspicuous among the buyers at the morning session. They were getting branded hosiery at mill prices to jobbers. Most of the latter thought the retailers would be filled up by noon and that in the later session lower prices would be the result. There was comparatively no sagging. The radically low prices came out in spots. It was an up and down sale, dealers eager for hosiery but sparring for bargains.

One fact established by the sale was, dealers are short of lisle and mercerized hosiery. If this were not true there would have been less buying at the higher prices.

The sale was regarded in the trade a wise move on the part of the Ipswich Mills, the manufacturers having chosen an opportune time for unloading a great stack of hosiery made from yarns taken in when yarn prices were more than twice as high as at present. The commission which the Ipswich Mills had to pay the auction firm was but five per cent, it is stated, about what probably would have been paid to selling agents. As the goods were sold 30 days net, the mills save what ordinarily is deducted from invoices for discount. As indicating that the mills have no stock in excess of that advertised for the sale, the catalog contained a provision that the seller was privileged to complete deliveries in 30 days.

All things considered, it was a good sale, in that it disclosed a scarcity of hosiery of the types offered, of which the trade has been taking only sparingly, and left no disturbing effect. It cleared the market of a stock of surplus hosiery and enabled the mills to liquidate on a very satisfactory basis. Furthermore, it was the means of the Ipswich Mills going direct to a great number of retailers, some of whom, perhaps, heretofore did not handle the line, and, it is apparent, eliminated many jobbers in transactions covering some hundreds of cases of hosiery.

One lesson to be drawn from the sale is, it is not expedient in these days of deflation and uncertainty to manufacture hosiery far in excess of dealers' needs. As the Ipswich Mills simply worked up high priced yarn and sold it at the best prices obtainable it must have sustained a loss no greater than if production had been suspended during the early days of the slump or gauged by jobber demand. To have bought yarn for continuing production would have been another matter. The heavy distribution effected through the sale suggests a dull market for some weeks for lisle and mercerized hosiery.

Distributors have been doubting there would come a scarcity of hosiery in 1921. Doubt has been dispelled; demand for full fashioned silks is far in excess of supply, and many buyers are turned away disappointed over deliveries. Orders for some thousands of cases have been refused by mills because delivery could not be made in March, and, in several instances, not before June.

Demand has been running strong for sheer silks—the flimsier the more popular, it seems. Chiffon and laces continue the vogue and are among the scarce things. Of silks in the several shades of fashionable gray there is virtually a famine. There may be full fashioned silk hosiery in the gray, but such stocks are not being dyed up at a rate that promises early relief from the acute shortage. Nearly all of the Philadelphia full fashioned mills are idle by reason of a strike of knitters against a reduction of 15 per cent from the highest wage ever paid, and there is nothing in sight to indicate an early termination of the controversy initiated by ill-advised union leaders. The idleness of about 21 mills is the prime factor in the depletion of stocks. Mills elsewhere are having a busy season, and it need not be surprising if buying for fall be started soon, if the strike continues.

A survey of the full fashioned hosiery situation as relates to retailers was made in the early part of March, trustworthy reports from competent persons covering every section of this country. Large stocks and quiet business were reported in the Dakotas. This is accounted for in large part by the low prices of grain. On the Pacific slope normal stocks were found and the outlook was regarded encouraging. From Detroit and throughout Michigan reports of large stocks were received and merchants were buying conservatively. The decided slump in the automobile industry is held accountable for this situation. Throughout the South the reports indicated ample stocks and merchants operating with extreme caution, many complaining of a shortage of ready money. This is viewed as but a reflex of the depressed cotton market, and in most of the southern states it was the feeling an improvement was in sight. Normal stocks are reported in Pennsylvania, West Virginia, Ohio, Indiana and Illinois, and conservative buying was the policy of merchants generally. Iowa, Wiscon-

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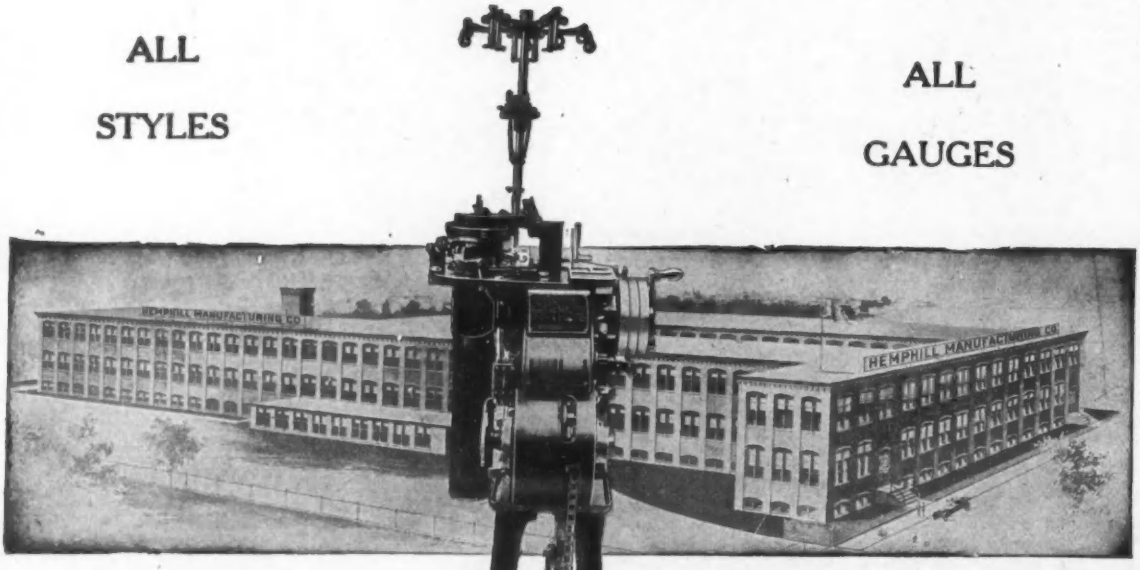

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sin, Missouri, Kansas, Nebraska and Oklahoma were in the normal stock zone, and in most of these states, where buying was on a basis of conservatism, merchants spoke encouragingly of the future. The two extremes were found in New York and Texas, the latter state having rather low stocks and dealers expecting better business shortly, while in New York stocks were reported heavy and business quiet. New York generally is the bluest spot on earth during a declining market and runs to an excess of enthusiasm when prices are upward. New York is a good place for trade interests looking for encouragement to put on the visiting list for a later date.

The survey is regarded as showing no necessity for having production at mills exceed buyers' needs as expressed in the attitude of distributors, who never are at a loss to find excuses for staying out of a market in which prices are down to even a safety level. A few weeks ago it was the occupation of German territory by armies of the Allies. Then it was the railroad situation, the jobber always overlooking the signs of better times ahead.

The distributor has proved a curious creature in these days of stress. He wants only a little and wants prices guaranteed at that. As a matter of fact, he seems a trifle sceptical of the guarantee because of the experience of one larger distributing house. This establishment was given the seller's guarantee that if the latter sold later to others at a lower price, up to a given date, the buyer was to be rebated for the sum of the difference, even though he had, in the meantime, sold the goods. The seller did reduce his price, and the jobbing house claimed about $17,000 under the guarantee. "We do not have that much loose money just now," the mill explained, "but we will be glad to make up the amount on your next purchases." Here the matter ended, and the mill lost a customer.

It is pointed out that, if the cotton-grower and sheep-raiser, and the wheat and corn farmer were to produce on the piecemeal and hand-to-mouth basis on which jobbers are operating, forcing a restrictive policy on manufacture, there would not be enough clothing and foodstuffs to give the population one square meal a day. Every element in supplying the country's needs is doing its duty except the interests between the manufacturer and the consumer.

The present heroes in the battle for complete readjustment are the railroads, the master builders and other large employers, who constitute the last line of attack on war-time prices. They will bring the wages of their employees down to about the level of those in the factory, on the farm and in the ranks of the semi-professional class, with the result construction work will be resumed, and the transportation companies will get enough freight and passenger movement to enable them to pay their way. The Trotzky of American unionism may not be dethroned, but he is losing his influence, and labor will get back to work.

The average merchandising head knows this. He is getting his normal profit—whether wholesaler or retailer. The producer is carrying the burden. Low priced hosiery is lagging because many of the weavers of cheap goods are unemployed. High priced silks and heathers are selling because there is not enough production to meet demand from not only the wealthy, but the wage and salary classes as well. The average American was educated, during the period of high-grade men's pay for unskilled labor, to dress better, and need not abandon the commendable habit if workers work. There can be so much production that competition would be a bar to high prices.

Men's and women's drop-stitch, embroidered heathers are sold up by several mills well into Fall, one line of women's fancy heathers being off the market except for deliveries after November. Men's and children's heathers are sold as far ahead as October, by several mills.

The effect of competition on price was shown in the recent drop in silk half hose—from $8.50 to $7.00 a dozen for full fashioned, and from $6.00 to $5.00. The silk goods were not selling at the higher figures, and did not respond sharply to the reductions. Demand was absent, whereas, in women's silks, at $13.75 for standard lines, it is away ahead of supply.

The cheaper hosiery from some of the mills is finding ready sale. A line of 176-needle mercerized half hose is sold well ahead at $1.75 for single sole. Orders for high grade 144-needle socks have been rejected when buyers offered less than one dollar a dozen, while the same gauge half hose from some of the Pennsylvania mills was available at 85 cents a dozen. Men's and women's 176-needle cotton stockings may be had at a variety of prices, extremes being represented in a difference of 20 cents a dozen between high and low. Published quotations on low end carded goods, and the coarser gauges of combed, are meaningless, and cause confusion, rather than serve any good purpose. Misses' fine gauge ribs, carded, combed and mercerized, are a fairly good number, and some few mills, which, a short time ago, were closed down, now are operating about 50 per cent of capacity, and, on that basis, are kept steadily engaged. In Philadelphia, a few seamless hosiery mills still are idle. One is operating less than 15 per cent of capacity, and few touch 60 per cent. The average appears to be about 45 to 50 per cent of possible output.

A Maryland mill has been having fair business on its women's rib top cotton stockings at $1.75 to jobbers.

Aside from the Ipswich sale, the announcement of the new low prices, protected to October, by the Durham (N. C.) Hosiery Mills, was the spectacular emphasizing of market dullness. While the Durham put prices down to about the basis of eight-cent cotton, the management seemed to realize that such a radical concession might not be sufficient to stir jobbers to action, and accordingly put on a guarantee that gives the merchant considerably more than the pound of flesh. The guarantee provides that if the Durham prices be reduced to late buyers, up until October, early buyers are to be rebated for the difference, even though, in the meantime, they may have sold and been paid for the hosiery. It is not recorded that jobbers, taking advantage of this very liberal form of protection, exact collateral or a surety company bond.

Some of Durham's new prices are lower than were obtained for like numbers at the recent auction of nearly three million pairs. The mill names $2.75 for half hose and $2.85 for women's stockings, both 220-needle, full mercerized. These prices are subject to a re-sale discount of 20 per cent, and a trade discount of 3½ per cent 15 days, 2/10—60 extra. As the company permits deduction to cover freight, the mill will get, as net prices, about $2.10 for half hose and $2.17½ for the women's stockings.

According to a person close to Durham interests, the big North Carolina mill lost patience with smaller mills

which were gathering in some business at sacrificial prices, cut to the bone, and went to the limit at one stroke. It is a question with some traders whether protection of strikingly low prices for six months is not calculated to have a more disturbing effect than the emptying of warehouses by auction sale. Either the low price without a guarantee, or a guarantee at say 50 cents a dozen more, some persons believe, should have been all that the most shaky buyer might ask.

In view of the mild winter and many workers being unemployed, wool socks do not give promise of an early active movement for the coming Fall season. A leading mill has priced 84-needle half hose $1.05, basis of two pounds. This is a radical drop from the wartime top, but still is 55 cents above the mill's lowest prewar price.

Many jobbers, who are buying hosiery from hand-to-mouth, and do not supply mills with bands and labels and stamping, are paying the penalty for their homoeopathic way of doing business. Since buying for 30 to 60 days became common, a number of orders have been cancelled for no other reason than the inability of mills to make shipment because of non-arrival of bands and labels from printers.

An important order from a jobber was held up for several weeks owing to inattention to an order from the mill for hosiery stamps. Dunning letters from the mill brought no response from the stamp maker, and meanwhile the jobber was pressing for delivery of the goods. Many manufacturers who have suffered or been threatened with cancellations for non-delivery in such circumstances are insisting the jobbers supply bands, labels and stamping or agree to hold the mill blameless if, through no fault of the mill, the branding matter has not been received.

Buyers deferred making their purchases until so late that printers of bands and labels are as much rushed as are manufacturers in getting goods out within the period specified.

Jobbers continue to buy light underwear for the current season. Purchasing has been of dozens rather than cases, with the result mills are flooded with re-orders. Most of the Pennsylvania mills are sold up to June 30th, but still are booking business, in the knowledge not all of the orders can be filled. The less desirable accounts now are receiving scant attention, and last year's cancellors will be the last to be served by mills who take the precaution to obtain complete credit reports before accepting new accounts.

A great deal of bad business has been offered to mills, and some unsuspecting manufacturers carrying surplus stocks have been caught by scheming dealers. In this way not a few merchants who are dodging mills with which they are delinquent are drawing supplies from others. The National Association of Hosiery & Underwear Manufacturers is urging members to open no new accounts until they have satisfied themselves of the financial responsibility of those coming to them for the first time for goods.

Manufacturers named very low prices for heavy cotton underwear, the opening for which was set for March 14th. Mill heads were in New York for the first real tryout on Fall goods, but jobbers did not respond. They regarded it too early to gauge sentiment, and from what could be gathered from buyers it appeared they felt the low prices were not low enough. Boast was made openly, "We will buy cheaper later." The heavy underwear market is undergoing what was experienced last year in light weights for the current season, and it seems buying will continue during the entire season in very light quantities, the bulk of the business coming late in hurry re-orders.

Only a few manufacturers had the temerity to go on the market openly on the 14th, most of them remaining out pending something more definite on the attitude of buyers toward values.

A Pennsylvania manufacturer was among the few to formally name prices on March 14th. The mill, manufacturing ladies' garments only, was quoting $6.25 for 7 pound vests and pants, 75 cents additional for extra sizes, and $10.50 for 11 pound suits, $1.25 additional for extra sizes. It is understood several small orders were placed at these figures.

The sub-standard 16 pound cotton ribbed union suits of a southern mill opened at $10.00 a dozen, which is $11.50 under last year's peak, and $4.25 above the record low price, which was obtained when cotton was selling at seven cents.

A Utica, N. Y., mill quotes $11.50 for the 16 pound suit, and $6.37½ for 11 pound shirts and drawers. The southern mill's price for 10 pound single garments is $5.00, against $10.50 last year and $2.75 during a seven-cent cotton period.

Prices were of no moment to buyers. They appeared to be playing the same game that was successfully played against light weights last year.

Some of the heavy weight mills, instead of waiting for the opening, had salesmen on the road since the first week in March, and have been receiving a sprinkling of small-lot orders, these seldom exceeding five cases. To jobbers visited by road salesmen prices appeared satisfactory when it was explained that they would be protected against seller's declines. One order which came through called for July delivery and price protection until September. This order was not accepted.

Manufacturers who are guaranteeing prices are making trouble for themselves in after years. More co-operation in resisting unfair demands of jobbers and less eagerness to do business on the heads-you-win, tails-you-lose plan of gambling, would spare many sellers much strife and annoyance.

A New York knit goods selling agent a few weeks ago met a number of the Pennsylvania underwear manufacturers in conference for urging that they guarantee prices. Only one of the group was willing to admit openly that he would do so. They took the stand that it is the duty of selling agents, while serving jobbers, to protect the manufacturers whom they represent, and that to extend the guarantee carries no protection to the seller while conferring it on the buyer. It was said after the meeting that agents who advocate the guarantee lack confidence in their ability as agents; that if it becomes necessary to guarantee prices it will not be necessary to sell through agents. Most of the selling agents are opposed to the practice—at any rate they say so in the presence of manufacturers.

Sweater coats for spring and summer are enjoying a brisk market. Mills making silk, artificial silk and light weight worsted garments are having a strong run of business on hurry delivery orders, with every machine engaged, while machinery adapted only to heavy weights is idle. Buying for spring was delayed by most jobbers,

and now they must have next week the sweaters ordered this week.

Winter sweaters, which should have been bought a month or two ago, are attracting but little attention, and it is the impression of some of the leading manufacturers that actual demand will not develop until about the first of June. Jobbers are afraid of present mill wage scales and prices of wool and worsted yarns. Domestic yarns are having a struggle in competition with English wool and worsted, which are understood to be offered in the domestic market, freight and duty paid, at less than the cost of production here. This is one of the elements of uncertainty in the heavy weight sweater coat market.

Knitting Technology Abroad.

Students engaged in the knitting industry in this country who desire to spend a period in England studying the technological side of their business will doubtless be interested to learn of the new developments in connection with the University College, at Nottingham, England, the historic seat of the hosiery industry of the English Midlands. The director of the department of hosiery manufacture at this institution is Prof. William Davis, M. A., who has for a number of years been known to the readers of Cotton through his articles on knitting subjects which have appeared in our Knitting Section from to time.

The practical equipment of the college embraces the following sections: A complete set of practical apparatus for textile testing of fibers, yarns and fabrics used in the hosiery trade; nine varieties of machines for making knitted web, plain and fancy, such as spring needle circulars, loop-wheel frames, latch needle webbers, plain and ribbed. There are also stocking frames, several flat knitting machines for coats and gloves and circular hand stocking knitters.

This equipment also includes three types of winding machines and a full assortment of automatic hose machines for making hose, half-hose, children's hosiery, plain and fancy. Over 20 machines have been installed for seaming and finishing, including the well known types used in the trade, and a full plant for securing and pressing and finishing the fabric and making complete garments is in course of installation.

Professor Davis is assisted in his work by a staff of teachers and practical demonstrators who have had a thorough practical factory experience in the manufacture of English hosiery and the college is particularly strong on the scientific side, the hosiery students having the benefit of the splendid range of chemical and physical laboratories of the college for their allied scientific studies.

The University College at Nottingham ranks high among English institutions of learning, and the courses provided there in knitting and hosiery manufacture should receive the careful consideration of young men desirous of going to Europe to further study the technological side of the industry. Time spent in this institution would, we feel sure, be most profitable.

Enthusiasm is a lubricant that makes the wheels of trade go 'round; a grouch is the sand in the bearings.

Among the Knitting Mills.

The Mi Belle Knitting Mills, 1833 Washington Avenue, New York City, have leased space in the building at 220-30 West Nineteenth St., for a new branch works.

The Western Knitting Mills, Rochester, Mich., are planning for the installation of a new filter plant, to replace the structure recently destroyed by flood, caused by rising waters of the Clinton River.

The Gloversville Knitting Co., Schenectady, N. Y., is planning for the installation of about 100 new knitting machines and auxiliary operating equipment in the new addition to its plant, recently completed. Equipment in the present mills will be re-arranged and re-located for greater facility in operation.

The C. K. Knitting Works, Hoboken, N. J., have filed notice of organization to operate a knitting mill at 3671 First St. Charles Kramer heads the company.

The Kommel-Bailey Co., New York, has been organized with a capital of $50,000 to manufacture cotton underwear, hosiery and other knit goods. The company is headed by I. Bailey and J. Kommel.

The Malden Knitting Mills, 223 Eastern Avenue, Malden, Mass., have had plans prepared for alterations and improvements in their plant to cost about $6,000.

The American Knitting Company, Wayne, Pa., has increased its capital stock from $30,000 to $60,000. Asa E. Bryan is treasurer.

The Hickory (N. C.) Hosiery Mills will establish a branch plant at Lenoir, N. C., which it is expected to have in operation shortly. A suitable building has been leased and the plant will start as soon as the machinery, which has already been ordered, is received.

The Yarn Market.

During the last month the Philadelphia cotton yarn market passed through a continuation of the previous month's price decline, together with a decreased demand for all counts and irregular quotations on some counts. Spinners were reported as curtailing production more and more each week, but this situation had little evident effect upon the market.

Prominent among the price reductions in the first week were those in southern carded yarns, certain counts of this grade going to new low figures. Fully one-third of the regularly listed southern carded counts lost all of, and in some cases more than, their January rise. Estimates made during this period by reliable distributors indicated a southern yarn production of between 60 and 70 per cent of normal spinning capacity, while the consumption of yarn did not exceed 30 per cent of normal.

It is stated that the spinners in the South who are operating their plants at present may be divided into two classes: those who are possessed of unbounded confidence in a sharp and prolonged recovery in cotton, yarn and goods, and those who are running chiefly because of the economic necessity of their help, and a desire to keep their organizations intact. It is because of the operations of these mills, it is declared, that yarns, for which there seems to be little outlet, are piling up on the market.

The collapse of the cotton market affected cotton yarn

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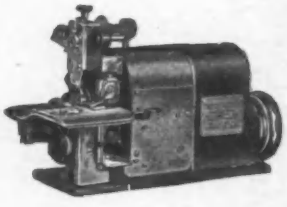

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prices in a very forcible manner, and the second week found business in these lines very stagnant. The severity with which the cotton slump caused yarn prices to sink discouraged buying, because many who were already in the market with probably an intent to buy retired when the big shocks came in the hope of securing lower prices later.

However, there was some business reported, principally in small lots for southern carded weaving yarns, but the total volume of business done was small, and there were enough "distress" yarns offered to fill all requirements that had to be covered at once, in most counts. Southern knitting yarns got but a small share of inquiries or orders.

At the close of the third week of the month, as recorded in these columns, in which a change in administration took place at Washington, yarn prices were still sagging under the pressure of surplus stocks in distributors' hands and a very noticeable lack of demand therefor. The advent of the Harding administration was celebrated in the yarn market by a pruning of prices in carded skeins, warps, tubes and cones in the southern section of the list and in northern carded cones. At this time some of the carded counts—which seemed to have been the hardest hit in this slump—were selling at four to five cents a pound under their low figures during the depression which obtained in this market from May last until January.

There was very little interest and less inquiry and business. Many yarn factors admitted that it looked as if yarn prices had struck bottom and that it was a good time to buy yarn. But it seemed that they believed it to be a good time for the other fellow and not themselves to buy, judging from the small amount of yarn activity.

It was brought out in Philadelphia yarn circles that during the two weeks ending March 12, cotton yarn rates fell faster than in any similar period since the early part of December. In this period the yarn price decline was declared to be almost as great as for the entire month of February. This continued even after the date mentioned and at this writing rates are still going downward. What little inquiry is being reported is on yarns for insulating and similar purposes.

It is the opinion of some that inasmuch as the slump in the tire industry, more than any other one factor, precipitated the collapse in yarns last fall, an improved tire trade would prove a stimulus to yarns. It depends, they state, upon the amount of operation by mills on tire fabrics, etc. And it is the further opinion of these factors that unless there is a recovery in the tire trade, there is very little likelihood of a revival of yarns in general before summer. It is expected that some of the mills controlled by the larger tire interests should receive an early impetus to resumed operation, resulting from a shortage of tires that seems certain to come owing to the heavy consumption during the winter months and the practical cessation of production for a considerable period.

It is of course generally understood that the larger organizations are nearly all practically stocked up with yarn and fabrics and that there will hardly be any necessity for them to enter the market for purchases for some time to come. This fabric and yarn was bought at high prices and while tremendous losses have been written off by some of the larger companies in their inventories the high price of the raw material is certain to be reflected in the price of the finished product.

On the other hand, the smaller, independent tire maker, who has carried no high priced yarn or fabric, will have the opportunity of producing goods at materially less cost than his larger competitor because of the much lower price at which materials can be procured, and it is quite likely that the smaller tire concerns will seize the chance which will be offered them, and therefore orders for yarns will probably result from these sources.

Recent Philadelphia quotations follow:

Southern Single Skeins.

4s to 8s	22	10s	23
12s	23½	14s	24
16s	24	20s	24 @25
24s	25½	26s	26½
30s	27 @29		

Southern Single Warps.

8s	22½	10s	23
12s	23½	14s	24
16s	24½	20s	26
30s	28 @29	40s	37 @39

Carded and Upholstery Yarns in Skeins.

8-3-4 slack	23@24
9-1-4 slack	23@24
8-3-4 hard white warp twist	22½@23
8-3-4 tinged tubes	17
8-3-4 hard twist waste	16

Southern Two-Ply Skeins.

8s	22½	10s	23
12s	23½	14s	24
16s	24	20s	24 @25
24s	25 @26	26s	26 @27
30s	27 @29	40s	36 @40

Southern Two-Ply Warps.

8s	23	10s	23
12s	23½	14s	24
16s	25	20s	25 @26
24s	27	26s	27½
30s	28 @29	40s	37 @40

Southern Two-Ply Combed Peeler Skeins and Warps.

20s	46	24s	48
30s	50	40s	60
50s	65	60s	75
70s	85	80s	$1.00

Southern Frame Spun Carded Yarn on Cones.

8s	22½	10s	23
12s	23½	14s	24
16s	24	18s	24½
20s	24½	22s	25
24s	26 @26½	26s	26½ @27
30s	27 @28	40s	37 @40
30s double carded			31@32
30s tying-in			26

Northern Mule Spun Carded Yarn Cones.

10s	27	12s	28
14s	29	16s	30
18s	31	20s	32
24s	35	26s	36
30s	38	40s	45

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	42	12s	43
14s	44	16s	45
18s	46	20s	47
22s	48	26s	52
28s	54	30s	56
36s	61	38s	62
40s	65		

"Finding and Stopping Waste in Modern Boiler Rooms" is the title of a new manual recently issued by H. S. B. W. -Cochran Corporation, 17th St. and Allegheny Ave., Philadelphia, Pa. This book is designed to aid the owner, manager and operator of steam boiler plants in securing and maintaining boiler plant efficiency. It contains over 400 closely printed pages of text, tables and charts on fuels, combustion, heat absorption, boiler efficiency, boiler testing and boiler plant management. In the selection of the matter included in this volume, only such statements were used as are supported by experiments and tests, it is stated. The coal crises of recent years have focused attention upon many matters hitherto neglected, such as improved methods of burning low grade and waste fuels, burning oil under boilers, burning powdered coal, etc., all of which are taken up in this book. The price of the book, bound in flexible cloth covers, is $1.00.

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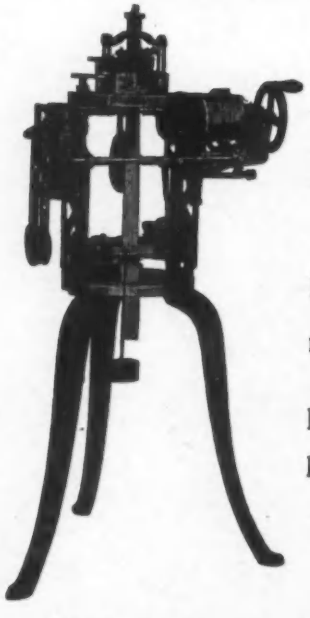

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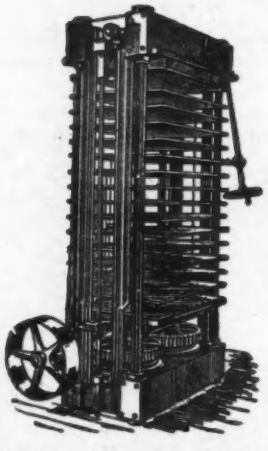

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The Demands of Color Fastness on Cotton.

(*Continuel from page* 422.)

The bleeding of self-dyed goods, even if the color is not changed, may not be harmful nor displeasing, but it is especially detrimental on mixed fabrics or those containing white. In this case, the active destructive principle is the temperature of the wash-waters. For instance, colors dyed with saffranine will turn bluer and bleed into white in distilled water at 75 deg. C., and still more decidedly at the same temperature in a weak soap solution; but the same color in a much stronger soap solution will not bleed in a temperature of only 30 deg. C. In a similar manner many other coal-tar dyes are affected. It goes, therefore, without saying that the bleeding in most cases may be prevented by using a wash-water not warmer than 35 deg. C. As a matter of fact, household washing of colored goods is done at a much lower temperature than white goods; and so unreliable is guessing at the proper temperature without the use of a thermometer that too great emphasis cannot be laid upon the advisability of casting aside such dyestuffs for use in dyeing vari-colored effects, whose lakes bleed easily under these conditions.

Natural and mineral dyes never bleed, also several aniline dyes, especially when dyed in full tones. Decidedly unacceptable in this case are most direct cotton dyes, with the exception of the diazotised colors. Most direct cotton dyes bleed even in light shades, in weak alkaline solutions only slightly warmed, and repeated washing in water colors woven together take up speedily the color as it bleeds off. However, direct cotton dyes show a characteristic fastness in another direction possessed by no other dyes, turkey red not excepted, in that after repeated washing and bleeding the brightness and depth of the shades seem hardly to be impaired. For self-colored wash-goods these dyes are very advantageous, also for fancy goods where the other dyed fiber is wool, as by severe washing the wool does not take up the color that bleeds off the cotton.

As regards fastness to fulling, an article such as this would be of very little moment, as the cotton fiber does not lend itself to this process, and would only be required to resist this influence where it is used as an effect thread in woolen goods. Therefore we will pass over to the more important demands of the trade—fastness against rubbing and perspiration. This requirement is of utmost importance in the production of hosiery and knit-goods, yarns, and corset coverings and linings, and should be taken seriously into account for goods used by the making-up trade in the manufacture of underskirts. The color should not rub off nor soil light-colored or white underwear, nor come off on the hands or gloves of the wearer.

As a remedy, precautionary methods are taken, partly by means of the addition of a sizing material to the dyebath or printing paste which is dried upon the fiber, and in a mechanical manner causes any loose color to adhere to the fabric, in part by a final passage through a tannin bath, whereby the dye forming the color lake in the under layers of the fiber is fixed in a chemical manner, and also by soaping the goods after washing, and in this way removing any loose or uncombined dye from the face of the material. Still any or all of these operations do not always give satisfactory results; the color will rub in spite of all, the color-lake has not penetrated the fiber sufficiently deep and has only fixed itself mostly upon the surface. The cause of the rubbing, therefore, is not on account of the dyeing process, but in the behavior of the dyestuff to the fiber.

Cotton possesses divers attractions for the absorption of lakes, and only such dyes for which the fiber has an attraction will produce results fast enough for rubbing. Indigo, for instance, which is squeezed from the fiber, and on that account always rubs, is exactly different from the benzidines which will not rub of themselves. Further, such colors as methyl violet, magenta and saffranine rub badly, whereas Saffranin S, Methylene Blue, Methylene Violet, New Blue and Indophenin are satisfactory towards rubbing. The proof consists in rubbing with the hand on white paper not too smooth, or, better still, with an unsized cotton rag.

Fastness to perspiration is often demanded besides fastness to rubbing, more especially with goods that come in contact with skin and absorb, or take up, the secretions thereof. Perspiration is composed almost wholly of water and traces of several acids, such as butyric, acetic and formic, and also phosphoric acid salts. The action of these bodies is exerted through the influence of the heat of the body and friction, and, above all, none the less aggravated by the concentration on the fiber of the perspiration with all its ingredients, through the continual drying out of the perspiration, which in time becomes even detrimental to the fiber itself.

The best test is to wear under the arm or sole of the foot the sample to be tried, or, for a laboratory trial make a weak acetic bath with distilled water and acetic acid of 30 per cent., heat to about 37 deg. C., the approximate temperature of the body, dip the sample therein and rub it with the hands for a minute or two, then, without washing, allow to dry at the ordinary temperature, and also between two pieces of parchment at 25 to 30 deg. C. This is repeated several times, and the more often it is done the nearer to nature does it come.

Another requisite demand for color fastness in cotton goods is towards chlorine or bleaching. This is necessary where the goods are to be bleached for the purpose of bringing out undyed parts of the fabric in a cleaner white. The operations, as are well known, are boiling under pressure, after treatment with chloride of lime, acid and soap. The boiling in water for such colors as are not destroyed in hot water, or for which the fiber has more or less attraction, is not detrimental, in fact, is rather advantageous, because the steaming tends to complete the combination between fiber and color.

Chloride of lime is very energetic in its destructive action on both natural and artificial dyestuffs alike, while dilute muriatic acid is of very little account in attacking colors which are fast to chemicking. It, on the contrary, is more energetic in its action on colors destroyed by bleaching, causing them to entirely disappear. The only influence of soap is, practically, in rendering the fiber more pliant and agreeable in handling. Colors fast to chloring are the colors produced by the oxide of iron, red liquor, and the like, in combination with alizarine.

To test colors for their fastness towards bleaching, it is best to boil, first, as many vat blues and turkey reds as are

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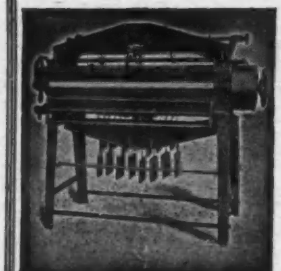

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topped with direct dyes. If bleeding takes place it proves the presence of benzidine dyes. Afterwards place the sample to be tested in a cold, clear solution of chloride of lime, about two deg. B., for one to one and a half hours, wash well, and pass through a weak sour, wash again and dry. Any color standing this treatment may safely be used for fancy woven effects which require bleaching afterwards.

The fastness to acids and sulphuring is, also, like fastness to milling, rarely demanded of the cotton goods dyer. It is more essential when turkey red or indigo blue is used for a fine cotton thread effect in all-wool goods with cream or white grounds that require a final sulphur bleach. So the general cotton dyer need not apply himself to this, unless he is producing goods afterwards to be handled by the rubber manufacturer.

It goes, therefore, without saying that the selection of dyes is of the utmost importance, and that too much time and attention cannot be bestowed upon such an important choice. As a basis for a comprehensive plan to meet the demands of most cases the following general rules will be found useful. It is known that fastness to washing is seldom found in combination with equal fastness to light and rubbing, so that the most important points should be taken into account first:

1. The demand of color fastness for hosiery and knit goods—(*a*) fastness to rubbing; (*b*) fastness to washing; (*c*) fastness to light.

2. The demands for yarns for wash goods—(*a*) fastness to washing; (*b*) fastness to light; (*c*) fastness to rubbing.

3. The demands for yarns for wearing apparel not requiring to be washed—(*a*) fastness to light; (*b*) fastness to rubbing; (*c*) fastness to washing (in so far as to withstand the finishing process).

4. The demands for curtains, covers, carpets, fringes, etc.—(*a*) fastness to light; (*b*) fastness to rubbing.—*Canadian Chemical Journal.*

A Bill to Promote Square Dealing.

A bill has been prepared by A. C. Jones, of Gastonia, N. C., and introduced in the General Assembly of that State for the avowed purpose of preventing public service corporations from abrogating existing contracts when it is found that, through a combination of circumstances, the original contract is not as lucrative as was at first intended, and it desires to make new contracts based on new, revised and higher rates. The bill reads:

A BILL TO BE ENTITLED:

"An act to amend Section 1066, Sub-Section 3, of the Consolidated Statutes of North Carolina, concerning the fixing of rates for public utilities by the corporation commission."

The General Assembly of North Carolina do Enact:

Section 1. That Section 1066, Sub-Section 3, of the Consolidated Statutes of North Carolina be amended by adding thereto the following: "Provided that in the consideration of any and all questions that are now pending or that may hereafter come before the commission involving a controversy between any public utility corporation and any person, firm or corporation, as to whether any rate is just and reasonable, if it shall be made to appear to the commission that such public utility corporation has heretofore entered into a contract with any such person, firm or corporation, wherein such public service corporation has voluntarily fixed a certain rate at which it has agreed to furnish electricity for the period covered by the contract, then and in all such cases the rates and other terms of such contracts voluntarily entered into by such public utility corporation shall be deemed and held by the commission to be just and reasonable; and it is hereby enacted and declared that the rates named in such contracts heretofore entered into by such public service corporations are just and reasonable.

"Sec. 2. That all laws and parts of laws in conflict herewith are hereby repealed.

"Sec. 3. This act shall be in force from and after its ratification."

In a comment appearing in the Gastonia (N. C.) Gazette, the following further explanations of the bill are given and they plainly indicate the interest this bill should arouse among users of the products sold by such public service corporations:

"I. The bill might properly be entitled: 'A Bill to Promote Common Fairness and Square Dealing.' It in effect merely requires that both parties to contracts heretofore entered into for the furnishing and consumption of electric power shall abide by the terms of the contracts.

"2. What plausible reason can be offered as to why the public service corporations of this state should not be required to stand by their contracts just as others are required to do?

"3. The public service corporations furnishing electricity persuaded the cotton mills to dismantle their steam plants upon the faith of the contracts of the public service corporations that electricity would be furnished the cotton mills for the period named in the contracts and at the rates fixed in the contracts. Is it not most unjust to the cotton mills to permit the public service corporations to abrogate their contracts upon the mere plea that these contracts have not turned out to be as remunerative as was anticipated?

"Is there any other class of contracts in which one party to the contract is permitted to annul and set it aside merely because it has turned out to be less remunerative than the party anticipated?

"4. Please note that the proposed bill binds both parties to the performance of the contract. During the life of the contracts, the cotton mills can not ask the commission to lower the rates which the cotton mills have agreed to pay, and, on the other hand, the public service corporation can not ask the commission to raise the rates above that fixed in the contract.

"It is an undoubted fact that the public utility corporations themselves dictated these rates, and that the cotton mills and others contracting for the use of electric power had no option in the matter, but were compelled to accept the rates which the public service corporations fixed.

"5. The public service corporations have said that by reason of the fact that there were many different rates fixed in the several contracts already entered into, they were seriously afraid that those who were paying the highest rates named in these contracts might bring suit against the public service corporation and recover the dif-

ference between the highest rate paid and the lowest rate named in any of these contracts. The effect of this bill is to declare that the rates in all of these contracts are just and reasonable, and thereby protect the public service corporations against any suits of the character named above.

"The courts will no doubt uphold this law upon the ground that each one of these contracts has some element of difference from all the other contracts, such as difference in amount of electricity, difference in the length of time covered by the contracts, difference in distance from points where electricity is generated, and numerous other differences that might be mentioned.

"6. It will be noted that the bill does not operate upon future contracts, but leaves the rates for the future to be regulated under the provisions of the general law. The effect of the bill is confined to contracts already entered into, on the faith of which the cotton mills and others have been making their plans and carrying forward their business affairs.

"7. It is the cotton mills of the State that are most affected by this bill. If there ever was a time when the public service corporations should be held to the performance of their contracts with the cotton mills, now is the time. These cotton mills are now going through a most critical period of depression, and it will be little short of ruinous to permit the public service corporations, in direct violation of the terms of their contracts, to impose the additional burden upon the cotton mills that would arise out of requiring the cotton mills to pay rates in excess of those named in the contracts."

Notes About Men You Know.

R. F. COBLE, who has for some time been superintendent of the Brison Manufacturing Co., Stubbs, N. C., has resigned and returned to Bessemer City, N. C., where he was formerly located.

CAPTAIN JAMES N. WILLIAMSON, one of the pioneer cotton manufacturers of the South, died on February 21 at his home in Graham, N. C. He was 79 years of age. Captain Williamson began his mill career immediately following the Civil War, when, with his brothers-in-law, the Holts, he managed the Alamance Mills. In 1881 he organized the Ossipee Mills and Hopedale Mills. He is survived by his widow, two sons, one daughter and eight grandchildren.

D. C. LEWIS is now overseer of spinning at the Locke Cotton Mills, Concord, N. C.

C. H. LOCKMAN, formerly superintendent of the Cochran (Ga.) Cotton Mills, has accepted a position with the Maginnis Cotton Mills, at New Orleans, La.

GEORGE D. SIMPKINS, SR., has taken charge as general overseer of spinning, spooling, warping and twisting with the Willingham Cotton Mills, Macon, Ga. Mr. Simpkins formerly held a similar position with Consolidated Textile Corporation, Pelham, Ga. Previous to his connection with this latter mill, he was with the Bibb Manufacturing Company, at Macon, Ga.

W. N. PATE, who has been overseer of carding at the Washington Mills, Fries, Va., has resigned to take charge of carding and spinning at the Hannah Pickett Mills, Rockingham, N. C.

E. E. ROGERS has resigned as superintendent at the Fulton Bag & Cotton Mills, Atlanta, Ga., and has been appointed assistant superintendent at the Riverside and Dan River Cotton Mills, at Danville, Va.

W. N. BAGWELL has been promoted from assistant superintendent to superintendent at the Fulton Bag & Cotton Mills, Atlanta, Ga.

RUSSELL W. EATON, who retired as agent of the Cabot Manufacturing Co., Brunswick, Maine, in March, 1920, after 30 years of service, died recently in a Portland hospital, at the age of 66 years. Mr. Eaton was a graduate of the University of Maine, class of 1873, and lived in Montreal prior to going to Brunswick.

J. C. JOHNSTON, for five years general superintendent of the Empire Cotton Mills, at Welland, Ont., has resigned to become associated with C. T. Grantham, former manager of the company, in the management and operation of a large American-owned textile plant to be erected in Welland. Details of the new industry have not been revealed. Several sites are said to be under consideration.

M. B. MELENDY has resigned as president and manager of the Cherokee Mills, Knoxville, Tenn.

THOMAS L. WARBURTON, who resigned recently as general manager of the Jenckes Spinning Co., of Pawtucket, R. I., to become general superintendent of the Nyanza Mills, at Woonsocket, R. I., was given a farewell banquet by business associates in the Jenckes Co., at a Pawtucket hotel. Mr. Warburton was given a Masonic charm and a "memory book" signed by all present.

GEORGE W. WATSON has been appointed to represent the United Chemical Products Corporation in the states of Georgia, Alabama, Tennessee, Mississippi and other southern points. Mr. Watson was formerly connected with A. Klipstein & Company. His residence address is Hazelhurst, Miss., and with the United Chemical Products Corporation, he will make his headquarters at the Aragon Hotel, Atlanta, Ga.

ROBERT C. BLOOD, president of John Blood & Co., Philadelphia, hosiery manufacturers, and treasurer of the National Association of Hosiery and Underwear Manufacturers, died on Thursday evening, March 3, in the Frankford Hospital. About a year ago Mr. Blood had an operation performed from which he never fully recovered. He was 51 years old, and was a native of Philadelphia. After graduation from school, at the age of sixteen, he entered the business which his father, John Blood, had founded. He had been president of the company for twenty years at the time of his death. Mr. Blood took an active interest in all matters relating to the knitting industry and was one of the leading figures in the work of the National Association, of which he has been the treasurer for many years. He is survived by his widow, a daughter and two sons.

Q. E. BRITT, formerly second hand in spinning at the Richland Mills, Columbia, S. C., has been made overseer of spinning at the Middleboro Mills, Batesburg, S. C.

A. H. BAHNSON, president and treasurer of the Arista and Southside Mills at Winston-Salem, N. C., has been elected secretary-treasurer of the Mayo Mills at Mayodan and the Washington Mills at Fries, Va., positions formerly held for several years by W. C. Ruffin.

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A Clean Mill To Work In

Means contented workmen, and contented workmen means better work and more of it. Coincident with the wave of receding wages that is sweeping over the land far-seeing employers are taking heed of the little things that go far toward making their employees contented and not the least of these is to keep the working place clean and inviting.

The "Two-in-One" Combination Sweep and Scrubbing Brush fits into the new requirements of the times because it is made to lessen toil and do effective work at the same time. Its use in any mill or workshop means absolute cleanliness, a big saving in labor cost, and minimum outlay in replacement. Write for catalogue and price list of brooms and brushes of all kinds.

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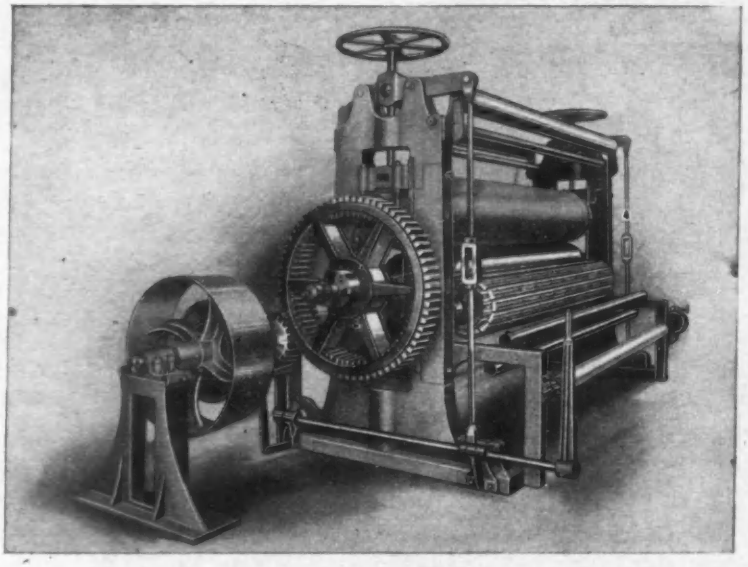

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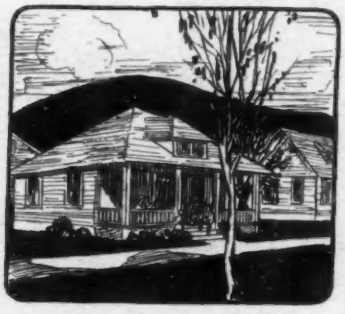

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They were good-looking houses, well-built, comfortable and modern.

But something was needed to make them homes.

"What's the trouble?" the textile mill manager asked his welfare worker.

And the welfare worker told him. These wives and mothers were mill workers. They had little time for the heavier home tasks. But they must be done. Wash-day strung out over the week, or else occupied valuable time which should have been spent in the mill. Indoors it was always steamy and soggy.

"Take the family washing off their hands—give them time to rest and live and breathe, time to beautify their homes and to enjoy their beauty, and you'll see a difference," said the welfare worker.

It was then that the general manager called in an American Mill Village Laundry Specialist.

"Build me a Mill Village Laundry. I want it done right—build me a plant that will take all of the washing and ironing out of these homes and one that will do it economically and well."

And in due time his American Mill Village Laundry was turned over to him, fully equipped, running smoothly, operated by a thoroughly trained force of experts.

Today there's a big difference in Mill-Town. There are blocks and blocks of neat, tidy homes where before there were only houses.

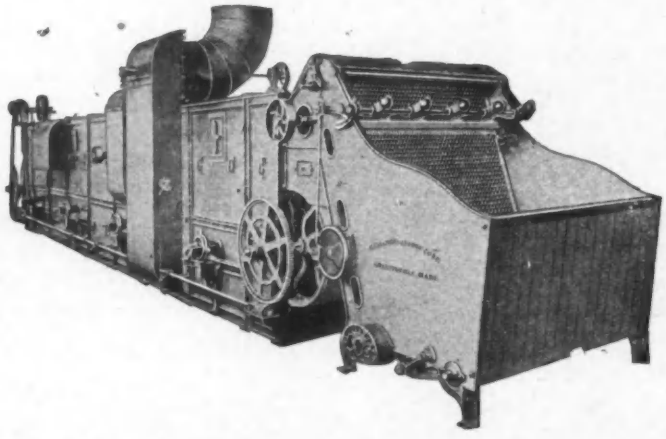
And every day at the frames in the mill itself there is a full complement of operatives, refreshed, cheerful, contented, energetic, 100 per cent productive.

Does it pay? Ask the general manager—ask yourself—then write us for full details.

The American Laundry Machinery Company

Specialty Department C, Cincinnati, Ohio

This composite factory group shows the manufacturing plant of the American Laundry Machinery Company, the world's largest producer of laundry equipment, and originator of the American Mill Village Laundry. The service of this organization is sold with every American Mill Village Laundry installation.



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There are over two hundred mills that can vouch for our statement that SARGENT DRYERS live up to our claims for rapid, thorough, uniform drying, yet preserving the natural life and structure of the fibre and accomplishing these results at the lowest consumtion of steam and power.

SARGENT DRYERS are backed by over 50 years of concentration in dryer manufacturing experience.

The SARGENT is designed on basic principles of air circulation, conveying and drying apparatus construction which has proven best from long experience.

Write today and let us explain the principles of SARGENT DRYERS. Made in models for drying cotton, linters, wool, hair, flax and any raw material.

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COCKER HOSIERY DYEING MACHINE

THIS machine has been thoroughly tested out with all colors and under all conditions, and is guaranteed to give the very best results possible in the dyeing of hosiery.

The stock is carried in four perforated metal containers equipped with one removable head on each container, and the containers mounted on Spiders in such a manner as to prevent their being loaded and unloaded quickly from the machine.

The Spiders carrying these containers are revolved in the vat *in one direction.*

Machines are furnished with either belt or motor drive.

Points of Advantage in This Machine That Must Be Considered

1st—Matting and chafing of the stock is entirely eliminated.

2nd—Percentage of re-dyes is reduced to a minimum.

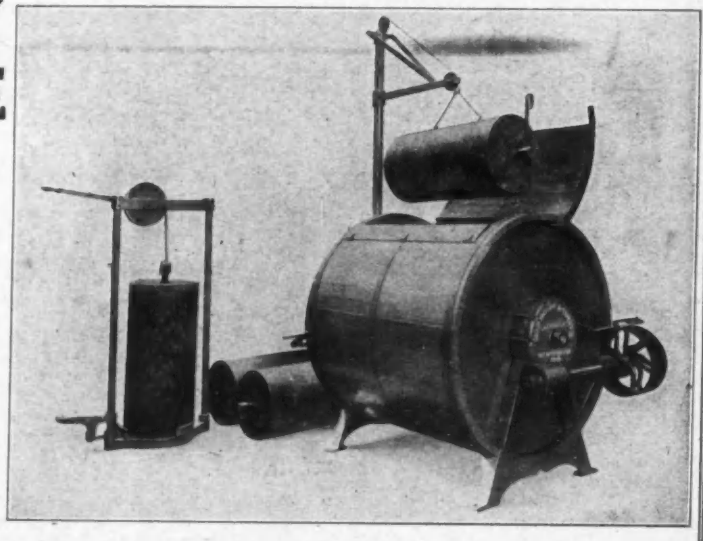
3rd—Different sizes and descriptions can be handled in one dyeing without confusion.

4th—Time required for loading and unloading machine reduced to a minimum.

5th—Albsolutely level dyeings on all colors.

6th—Minimum of power required for operation.

For further particulars and prices write or wire.



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A 48″ engine driven Tolhurst "Center-Slung" Open-Top Patented Extractor arranged for unrestricted access, rapid delivery and quick discharge. This machine is operating in a plant famous for the manufacture of hosiery, and is but one of the Tolhurst Machines used in this plant, the first having been installed in 1913. Detailed information relative to the remarkable service given by this and other Tolhurst Extractors in this and other plants will be sent to those interested.

Tolhurst "Center-Slung" Patented Extractors are constructed with baskets 40″ and 48″ in diameter and are arranged for motor, countershaft or engine drive. They have roller bearings, lubricated with grease.

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You take no risk when you buy a K-W Machine. Our years of experience and the efficiency of our methods of manufacture guarantee that every machine will "stand up" under the most exacting demands. Our interest in upholding the K-W reputation means that you MUST be satisfied, and our suggestions to prospective purchasers are made with the view toward solving any dyeing, bleaching or scouring problem for all time. We will be glad to answer any and all questions on your part whatsoever.

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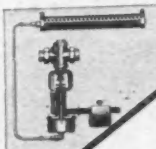

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A Powers Automatic Heat Regulator saves labor, by mechanically controlling temperatures as required, thus relieving operatives for work which machines can't do.

It also positively prevents the ruin of *material* through *overheating* or *underheating*.

The Powers Regulator never forgets—never procrastinates—never shirks. It controls the heat—keeps it where you want it—*all the time.*

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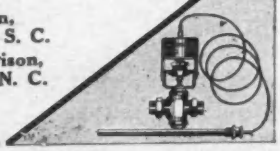

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TEXTILE manufacturers, dryers and finishers will find in "Proctor" Dryers the practical working out of many of their own desires and personally wished-for advantages in drying equipment.

This is the result of a close study of the users' detailed needs and opportunities with "Proctor" Dryers—a constant practice of this organization during the forty years it has specialized in the designing and building of drying machinery.

Get acquainted with "Proctor" Dryers—efficient, compact, economical, durable, fire-proof. For every textile drying need. Send for a catalogue.

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TEST COLOR FASTNESS BY RADIATION METHOD

The need for a basic standard brought the perfecting of this method of determining fastness to light of colors and dyestuffs.

The FADE-OMETER was

designed solely to fill a need for a standardized light equal in intensity to sunlight and available at any period of the year.

Elimination of the old time sun testing method has brought about a revolution of vast import to the textile manufacturer who using the Fade-ometer standard, reproducible tests can now be made in a few hours.

Unequaled for comparative service. Write us for fuller information in regard to this instrument.

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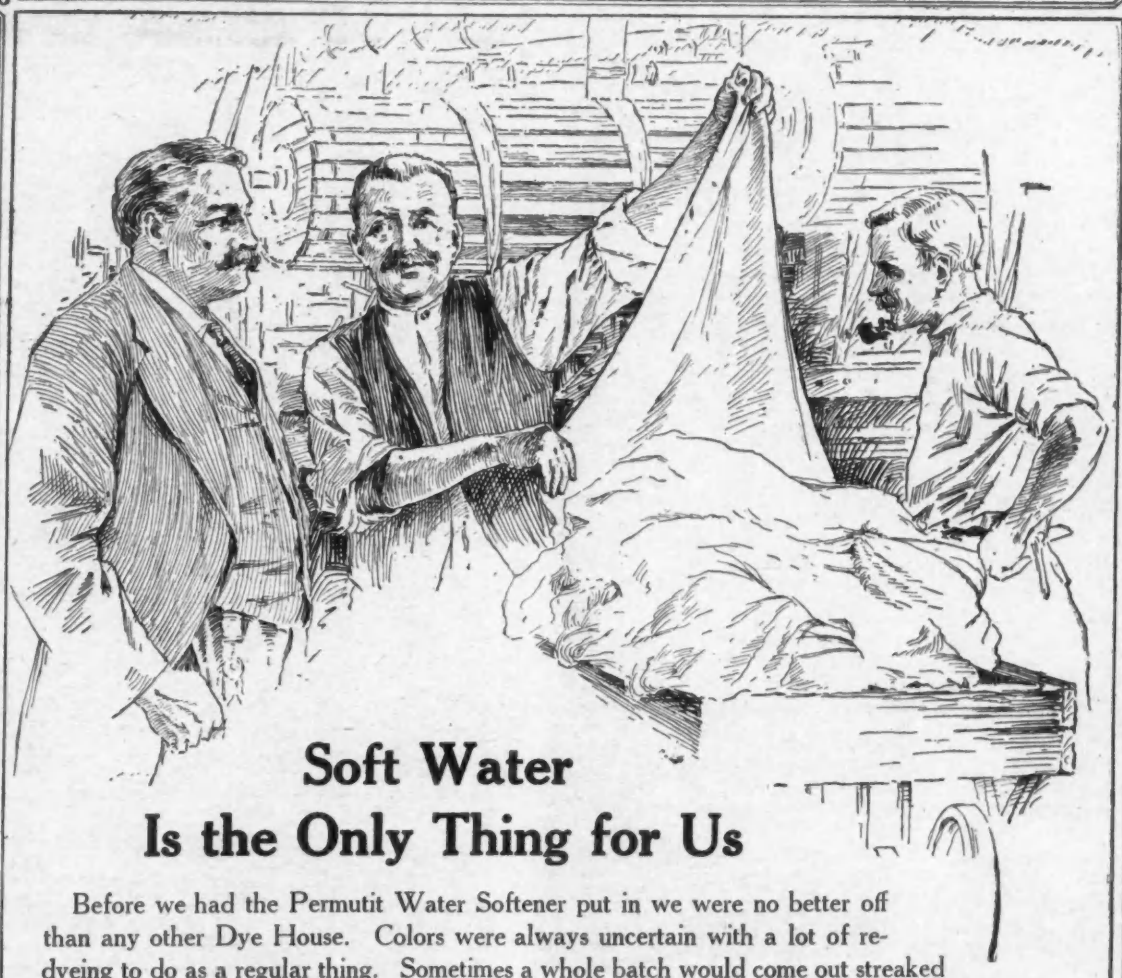


Soft Water
Is the Only Thing for Us

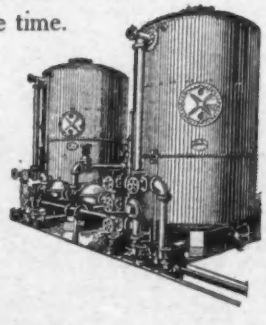
Before we had the Permutit Water Softener put in we were no better off than any other Dye House. Colors were always uncertain with a lot of re-dyeing to do as a regular thing. Sometimes a whole batch would come out streaked and spotted, and when we tried to match colors in different runs, we never knew where we were.

It's a lot different now, though.

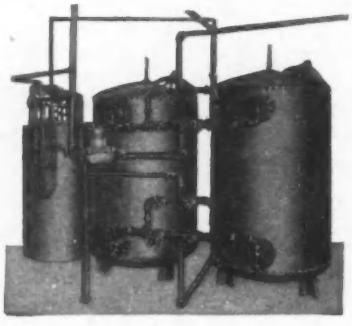
The Zero water (that means all the hardness has been taken out) is so uniform that we can work out formulas for colors and match them up nine times out of ten, and it's a rare thing to find spots or streaks.

We save a lot on supplies too. It figures out about 10 per cent saving on colors and 15 per cent for blacks in the dye house and in the washroom they save 50 per cent of their soap bill right along. The Chief Engineer figured out that he saves about 25 per cent of his coal too, due to having clean boiler tubes all the time.

There are hundreds of Textile Mills saving money with Permutit Water Softeners. Let us analyze your water supply and give you an estimate. No obligations. Write today.



The Permutit Company
440 Fourth Ave. New York
Offices in all principal cities



Borromite
Softened Water
In Any Mill

Decreases operating costs.
Speeds up production.

Insures maximum saleability of textile products because of their uniform beauty.

Send for our Circular.

Borromite Company of America

Members of Associated Manufacturers of Water Purifying Equipment

1516-105 West Monroe St. CHICAGO

DEGUMMING SILK HOSIERY

When used for boiling out silk hosiery the superiority of

WYANDOTTE TEXTILE SODA

is easily apparent. It not only removes all the impurities thereby leaving the hosiery in a far better condition for bleaching or dyeing, but as it also does it in less time the hosiery retain more of their luster.

May we give you further particulars?

THE J. B. FORD CO. Sole Mnfrs.,
WYANDOTTE, MICH.

ALL SIZING AND FINISHING PRODUCTS FOR COTTON

HYDROSULPHITE
For stripping and discharge printing.

INDIGOLITE
For indigo discharge only.

BENSAPOL
BLEACHING OIL
CREAM SOFTENER
GLASGOW SIZE
LEVULINE
SOLUBLE OILS
WHITE FINISH
MONOPOLE OIL
Reg. Trade Mark No. 70991

JACQUES WOLF & CO.
Manufacturing Chemists and Importers
PASSAIC, N. J.

SURPASS CHEMICAL CO. INC. USE IN THE AUTOGYP PROCESS OF DYEING. AUTOGYP PATENTED IN U. S. A. SEP. 26, 1916 IN CANADA OCT. 10, 1916 ALBANY N.Y.

Eliminates Bleaching Preserves Tensile Strength

The AUTOGYP Process of Dyeing eliminates *all* Bleaching of Cotton Underwear, Gloves and Hosiery for Mock Egyptian and other light shades.

It simultaneously dyes to shade and eliminates all specks, motes, leaf and shives in one operation and in three hours' time by the use of AUTOGYP which is the registered name of the chemical used in the process.

The process requires Three Hours' time instead of 15 and preserves tensile strength, saves shrinkage, steam, labor, water and all chemicals used in chloride of lime method. Let us prove our claims at our expense in *your* plant. Send for full information.

SURPASS CHEMICAL CO., Albany, N. Y.

AUTO GYP
Process of Dyeing

The Result of Continuous Care

"One hundred ninety-one firms reported a total of 24,736 employees engaged in the manufacture of coal-tar products, 2,605, or 10.5 percent. were chemists or engineers. This is probably a larger proportion of technically trained men than will be found in any other important manufacturing industry in the U. S."—*United States Tariff Commission Report.*

The reason for this preponderance of technicians is that each step in the intricate synthesis from the lump of coal to the brilliant dyestuffs must be under the constant observation of chemical engineers.

Coal-tar dyestuffs are the final effect of months of tedious laboratory research coupled with more months of semi-commercial experimenting and the last stage of actual plant production. Each step has its ever-watchful chemist, for the greater the care the better the dyestuff.

Du Pont Dyestuffs are what they are, because some 4000 earnest workers labor for their excellence, and of this number 470 are chemists or technically trained men.

E. I. du Pont de Nemours & Co., Inc.
Dyestuffs Sales Department
WILMINGTON, DEL.

Branch Offices
New York Boston Providence
Philadelphia Chicago
Charlotte, N. C.

CIBA COMPANY, INC.

CEDAR AND WASHINGTON STREETS, NEW YORK

Sole representatives in the United States of the
SOCIETY OF CHEMICAL INDUSTRY IN BASLE, SWITZERLAND

Special attention is called to

CIBA and CIBANONE COLORS
PATENTED

CHLORANTINE COLORS
Fast to Light—Level Dyeing Direct Colors

RHODAMINES

BRANCHES:

BOSTON PROVIDENCE PHILADELPHIA CHICAGO COLUMBUS, GA.

To Consumers of Alizarine Dyes

A. Klipstein & Company beg to announce that they have been appointed *The Exclusive Selling Agents* in the United States for the well-known products of

THE BRITISH ALIZARINE CO.
London and Manchester, England

The following can be supplied F. O. B. New York

Alizarine Red 20% all shades
Alizarine Red S. powder-(Soluble)
Alizarine Blue S. powder-(Soluble) for printing
Alizarine Blue S. C. B. paste, for wool dyeing
Alizarine Bordeaux 20%
Alizarine Orange 20%
Alizarine Cyanine paste
Alizarine Green X, for wool dyeing
Alizarine Green (Soluble) for cotton printing

The above products are all of Standard quality and shade

Samples and prices on request

A. KLIPSTEIN & COMPANY
644-652 GREENWICH STREET, NEW YORK CITY

RENAISSANCE

Of the demand for quality on the part of buyers is becoming more and more evident, resulting naturally from the desire of everyone to obtain the best value from his decreased purchasing power.

This change should be welcomed by everyone taking a pride in the quality of his production; and he who resists it will lose ground to his more enlightened neighbor.

"Atlantic Quality" has become the accepted standard for Sulphur colors, and yet we are always striving to improve on it by making our Atlantic Dyes better and better.

Atlantic Dyestuff Company
WORKS: PORTSMOUTH and BURRAGE
MAIN OFFICE, BOSTON
NEW YORK PHILADELPHIA CHARLOTTE
CHICAGO PROVIDENCE

ZAVON

The Super Solvent

The manufacture of ZAVON, the well known textile solvent has been taken over by a new company and extensive factories have been put in operation at Danbury, Conn.

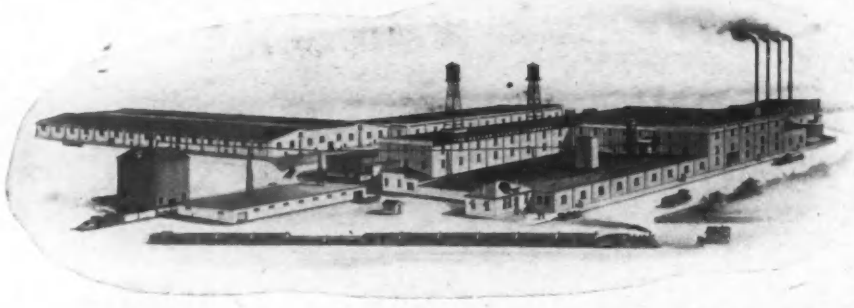
Here in the new factories ZAVON will be manufactured on an extensive scale to supply the textile industry with this superior solvent.

In the kier, the open kettle, or for all softening purposes, ZAVON is superior to soaps and soluble oils.

Send for working samples of **ZAVON** and learn the advantages of this effective solvent.

ZAVON COMPANY
Incorporated

60 Broadway
New York City



VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southern Agent: MR. JAMES H. MAXWELL, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

"BRETON" MINEROL "F"

For

Cotton Raw Stock

"It prevents harshness"

BORNE, SCRYMSER CO.,

Established 1874

80 South Street, NEW YORK

BOSTON PHILADELPHIA

Works: Elizabethport, N. J.

ESTABLISHED 1815.

Arnold Hoffman & Co., Inc.,

PROVIDENCE, R. I. NEW YORK, N. Y.
BOSTON, MASS. PHILADELPHIA, PA.
CHARLOTTE, N. C.

Importers and Manufacturers of

STARCHES, GUMS, DEXTRINE, ALIZARINE ASSISTANT, SOLUBLE OIL, SOAP

And Every Known Material from Every Part of the World for Starching, Softening, Weighting and Finishing Yarn, Thread or any Fabric.

Special Attention Given by Practical Men to Specialties for

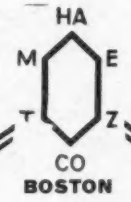
SIZING, SOFTENING, FINISHING AND WEIGHTING

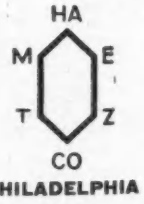
Cotton, Woolen and Worsted Fabrics combining the latest European and American Methods. We Believe There is No Problem in

SIZING OR FINISHING

That We Cannot Solve.

FORMULAS for the best method of obtaining any DESIRED FINISH on any fabric cheerfully given.





Aside from the line of Dyestuffs, Intermediates, Cotton Finishes, Turkey Red Oils, Soluble Oils and Leather Oils made in the U. S. by

Consolidated Color & Chemical Co.

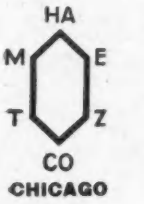
and

Central Dyestuff & Chemical Co.

ALGOL
HYDRON
HELINDON
THIO-INDIGO

vat colors will be procured for you on Import Licenses that may be granted you by the War Trade Board, or such of these colors as are available and made by the Farbwerke - Hoechst, Farbenfabriken vorm. Fried. Bayer & Co., Leverkusen, Leopold Casella & Co., Frankfurt, Kalle & Co., Bieberich, and Griesheim-Electron (Oehler) of Frankfurt. Licenses are granted for colors not made in the United States or not made in sufficient quantities or at reasonable prices. All products brought over on Licenses will be obtained by us at the lowest prices quoted for export to any one or any Government by the manufacturers.

A new color card of American made colors on cotton yarn is being distributed. Have you received your copy?

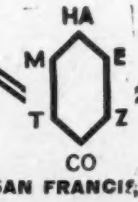


H.A.METZ & CO. Inc.

One-Twenty-Two Hudson Street, New York City.

Boston Philadelphia Providence

Chicago Charlotte San Francisco



IMPROVE YOUR BLACK

"DEVELOPENE"

Turns a *Rusty Black* to a *Lustrous One.*

THERE is no slight of hand connected with it. Send a pair of stockings, a skein of yarn or a sample of fabric, which has been dyed black, washed but not finished, to our Laboratory.

We will finish it with "Developene" and return to you. There will be such an improvement you will immediately want "Developene" for finishing your goods.

MANUFACTURED ONLY BY

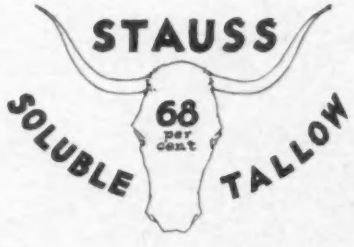
Kali Manufacturing Co.

MANUFACTURING CHEMISTS

1404-1410 N. Front Street **PHILADELPHIA, PA.** 1409-1413 N. Hope Street

Salicylic Acid Prevents Fermentation of Size

Sole Manufacturers of Hydroxy Oil and Kali Chlorine Neutralizer—the Superior Anti-Chlor. Formaldehyde.



Stauss 68% Soluble Tallow and Gum—Soluble Oils

for all warp sizing and finishing purposes.

None better.

Manufactured by Geo. P. Stauss,

Importers and Distributors of

Starches, Softeners, Weighting Compounds

Write, phone or wire

Southern Distributing Company

Manuel Faulkner, Sales Mgr.

50 Market St., Phone 3439 Charleston, S. C.

B. & L.

Anti-Chlorine Bleaching Process

FOR COTTON

Simple
Scientific
Safe

BOSSON & LANE

Works and Office, Atlantic, Mass.

Starch

Eagle Finishing

The experience of critical operators has shown this popular brand to be the most efficient sizing agent, both for additional WEIGHT and increased STRENGTH of WARP. Penetration accomplishes these important results.

EAGLE FINISHING is specially manufactured to cover a wide range of fluidities to meet the needs of all classes of weaves.

EAGLE FINISHING penetrates.

Corn Products Refining Co.

New York

Southern Office *Greenville, S. C.*

Starch

Mercerizing Gassing Bleaching

We have a new and strictly modern plant for mercerizing, gassing and bleaching.

Located as we are in the center of the combed yarn spinning industry of the South, we are enabled to furnish you with the highest quality processed yarns in all numbers.

The American Processing Company

Mount Holly, N. C.

NEW YORK REPRESENTATIVE:
H. B. ROBIE,
No. 346 Broadway,
New York City.

SELLING AGENTS,
THE RIDDLE COMPANY,
Mariner & Merchant Bldg.,
Philadelphia.

Perhaps we can give you the information

The superintendent of a mill wanted a lot of special corrugated paper boxes. We told him where he could get them.

Another superintendent wanted information as to where he might obtain some 2,000 horsepower of boilers. We gave him the names of several possible sources of supply.

So it goes. This service is free to readers of COTTON. We are always glad to be of assistance in filling your wants. Our files contain the names of manufacturers and dealers in every article or supply you can possibly want.

Let us help you find the things you need. Look first through the advertising pages of COTTON, then if what you want is not advertised write us.

We promise to give you immediate service. We know that we can be of assistance to you.

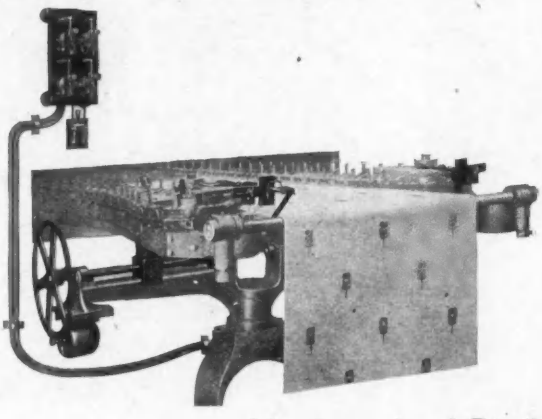
COTTON, Grant Bldg., ATLANTA

DECREASE COSTS

by installing

THE SCHWARTZ AUTOMATIC ELECTRIC GUIDER

PATENTED



Used on all kinds and weights of cloth.

Write us for further information.

Manufactured and Distributed by

BLAKE ELECTRIC MFG. COMPANY,

1 ROWES WHARF, BOSTON, MASS.

Southern Representative: GREER & CO., GREENVILLE, S. C.

FIG 50

Lane Doffing Trucks are made to wear. Heavy Duck and Spring-steel frame permit rough handling. Light weight, easy running. Mounted on our improved Thread-guard Casters, either stationary or swivel.

LANE

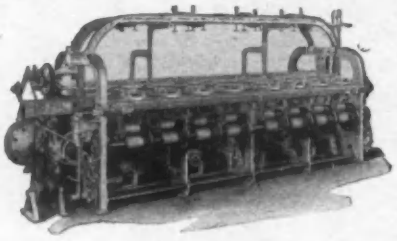
Canvas Mill Boxes and Trucks

Standard American Equipment

FIG.22.

Lane Canvas Mill Boxes are free from all roughness, thus reducing waste. Rim bound with tough leather. Shoes of hard maple, renewable.

W. T. LANE & BROTHERS, Manufacturers Poughkeepsie, N. Y.



Fletcher
Heavy Webbing Looms

are the Standard for
Weaving Solid Woven Belts

Never was the time more opportune to survey your weaving machinery equipment and tune it up for high pitch production at the lowest possible cost.

The time for economical production is here. There is no machinery investment you can make which yields so great a return—dollar for dollar—as FLETCHER Looms.

FLETCHER WORKS

Formerly Schaum & Uhlinger
Glenwood Ave. at Second St.,
Philadelphia, U. S. A.

AMERICAN
SUPPLY COMPANY
PROVIDENCE, R. I.

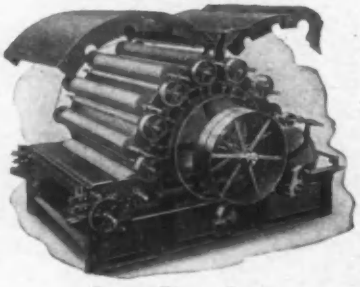
MANUFACTURERS OF

Loom Harness,
Weaving Reeds,
Oak Tanned Leather
Belting, Strapping
Etc.

We make a specialty of Harness for Warp Drawing Machines

NOTE—No orders too large for our capacity.
None too small to receive careful attention.

Smith & Furbush
Machine Company
Philadelphia



Cotton Waste Card.

Card shown above has been recently designed. It is especially adapted for the making of Absorbent Cotton, Wadding, Batts or Felts of the better grade, etc. Similar cards in sets are used for Cotton Waste Yarns spun on the woolen principle. Ask for circular S-165.

Specialists in all kinds of Waste Machinery.

DRAW-IN only only one time and change to any cloth when you weave with

"DUPLEX" FLAT STEEL LOOM HARNESS

Let us quote you

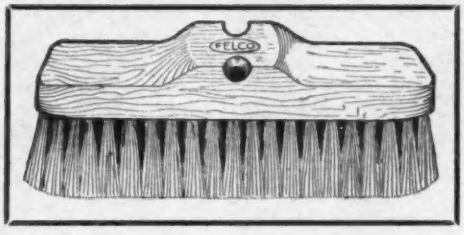
STEEL HEDDLE MFG. CO.
GREENVILLE PHILADELPHIA PROVIDENCE

Southern Office

111 Washington St. Greenville, S. C.

Hampton Smith, Southern Manager.

If It's a "FELCO" It's a Superior Brush



Hand and Power BRUSHES For All Purposes

Quality is the big item in Brushes today. The quality of the "FELCO" Brush is well established. We can furnish any line of standard brush and are always glad to co-operate with our customers in making them any special brushes.

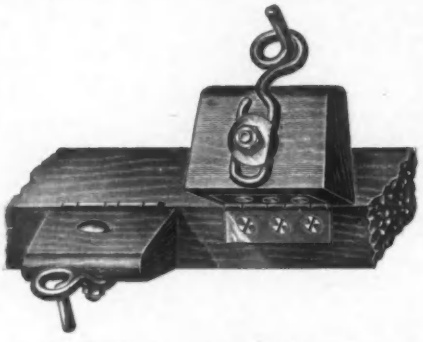
One of the features of our organization is our repair department. In these times when the saving of money is necessary to a successful mill we believe we can aid you in cutting expenses by repairing your worn-out brushes and making them as good as new.

ATLANTA BRUSH COMPANY

SUCCESSORS TO D. D. FELTON BRUSH CO.

CENTRAL AND TRINITY AVES. ATLANTA, GA

The Palmer Adjustible Thread Guide



For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

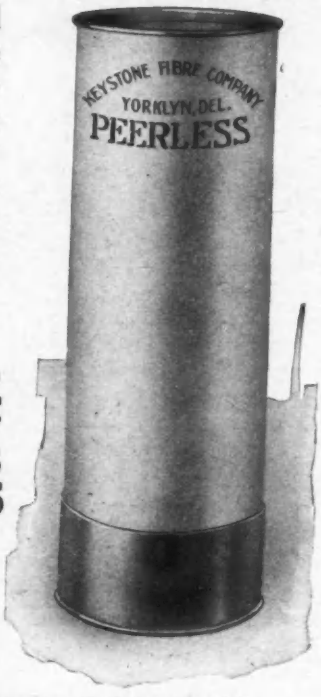
Middletown, - - - Connecticut

Strength and lightness are the ideal combination. The roving cans that last longest and are handled most easily are those made of the strongest and lightest fibre, Keystone Fibre.

KEYSTONE "PEERLESS" SEAMLESS ROVING CANS

Send for our booklet of Keystone Holloware for mills.

Orders filled through any responsible mill supply house, or direct.



KEYSTONE FIBRE COMPANY

Box 244, Yorklyn, Delaware.

Southern Representatives: The Wilson Company, 408-409 News Bldg. Greenville, S. C. Philadelphia Office: 504 North American Street
Boston Office: 136 Federal Street

"Cotton Mill Machinery Calculations"

EVERY Textile Man should have these reference books. They cover in a detailed and thorough manner all calculations necessary to be made on any cotton mill machinery manufactured in the United States and constitute one of the best references on the subject obtainable.

The two volumes are illustrated with 45 diagrams and contain 21 reference tables.

As the value of a book lies in its contents and not in a fancy cover, we have put these two volumes out in a strong, serviceable paper binding. You can secure them in conjunction with a subscription to COTTON.

Write for circulars and full information.

COTTON, ATLANTA, GA.

An All Year Round Drinking Fountain

THE "QUICKOOL" supplies clean cold drinking water for your workmen all the year round. During the hot summer months or in the hot dry departments of your mill, it cools the water economically with ice. When ice is not needed, "QUICKOOL" is still on the job, the most sanitary fountain because of the

"QUICKOOL"
Protectajet Bubbler

As the illustration above shows, the jet is fully protected from the backfall of water, from drinkers' mouths and from all dust and dirt. The Protectajet lifts as the water is turned on and drops as it is turned off. This makes the "QUICKOOL" automatically and permanently sanitary.

The value of plenty of good cold drinking water—handy—in employee efficiency has been clearly established. Put "QUICKOOL" to work in your mill.

Write for prices and details.

The CENTRAL BRASS MFG. CO. of CLEVELAND

Diamond F Seamless Roving Cans

100% service can be obtained by installing Diamond F Roving Cans.

Attractive, strong, durable, free from burrs or other rough spots that catch the stock.

We also make a full line of other receptacles, such as trucks, sample cases, baskets, locker boxes, etc.

Send for our catalogue
"Diamond Fibre Receptacles"

Diamond-F

Dept. 8

Diamond State Fibre Company

Bridgeport (near Philadelphia), Penna.

Branch Factory and Warehouse: Chicago

Offices in Principal Cities

In Canada: Diamond State Fibre Co. of Canada, Ltd., Toronto

Odd, Isn't It

—that some people think of advertising as a means of benefitting only the seller, when its basic function *must be* to render a necessary service to the buyer, else it could not exist. Merchandise lives or dies as it does or does not meet a human need. Advertising is subject to the same law of service The real measure of its value is what it *gives*, not what it gets.

In the light of these truths, the marvelous growth of advertising in itself, is an impressive demonstration of its essential character in our economic system.

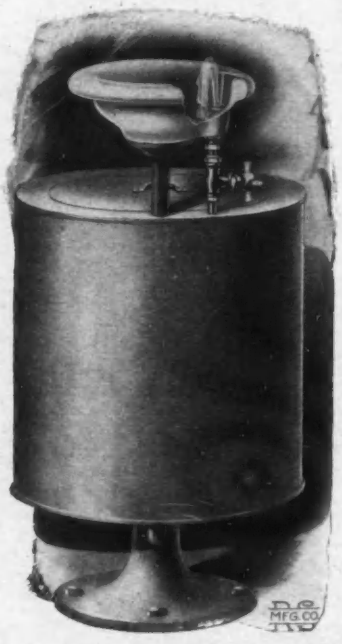
But you are not interested in *all* advertising any more than you are in all merchandise. That is one big reason why you have a highly specialized Business Paper in your field such as the one carrying this advertisement. It was born of your needs, not of any man's desire to be a publisher.

Timely authoritative, comprehensive, statements about needed materials pass in review as the advertising pages are turned. Confident judgments can be formed, and intelligent decisions made.

Yet advertising is NOT an *added* expense, but an improved distributive process, which takes the place of slower, more costly and less efficient methods.

That is why it pays to *read* advertising even more than it pays to advertise. Especially if you read it in COTTON, for one of its standards of practice requires it to *decline any advertisement which has a tendency to mislead or which does not conform to business integrity.*

The Perfect Cooler with the Famous Vertico-Slant Fountain



Hot weather is approaching, and don't forget that a cool refreshing drink of water renews the employees' energy and sends him back to his work refreshed and more productive and that coolers placed at convenient places saves his time and yours.

However, in selecting a cooler fountain, don't select one with a vertical stream, for science has definitely proven this to be as great a germ spreader as the old style drinking cup. In the Vertico-Slant Fountain the water after touching the lips cannot fall back and contaminate. Lips cannot touch nozzle.

The Vertico-Slant Cooler Fountain has a galvanized coil through which water passes to drinking head without coming in contact with ice. The interior is insulated with cork, making a great saving in ice.

Write for our attractive catalogue.

Rundle-Spence Manf'g Co.
Milwaukee, Wis.

The Water Bubbles Up Ice Cold

Erect or Inclined Stream

It's unsanitary to drink from cups. Get a Keith Bubbler in connection with our cork-jacketed ice tank and the cup nuisance can be eliminated.

The cork-jacketed ice tank cools the water as it comes from the municipal supply pipe and requires only one supply of ice for the hottest day of continuous service.

15½ Coils of Brass Pipe.

Everybody likes it because it's always clean.

Get Our Catalog

Send for our complete Catalog, showing our Wash Bowls, Metal Lockers, All Steel Stools and Chairs with Insert Wood Seats, Stock Storage Racks, Metal Shelving, Metal Vault Fixtures, Improved Soda Kettles, 40 and 60 gallons, Water Heaters and Instantaneous Mixers, Bubbling Drinking Fountains, Work Benches and Bench Legs, Drawing Stands. Full lines of Plumbing Fixtures, etc.

Manufacturing Equipment & Engineering Company
139 Federal St., Boston, Mass.
Works and Mail Address, Framingham, Mass.

VOGEL
PATENTED

Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

No. 1

Enameled roll flushing rim bowls.

Heavy brass valves.

Strong hardwood seat.

Galvanized tank.

Malleable seat castings will not break.

Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.
WILMINGTON
DELAWARE

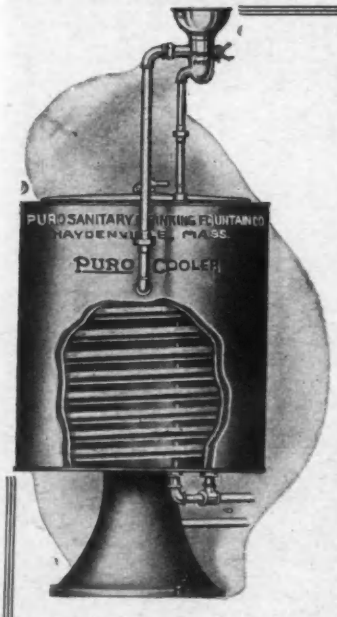
Workman's Compensation Acts Require First-Aid Equipment

Are you prepared to give first aid to injured employees? You of course know that the Workman's Compensation Acts require this, and mills are realizing that this Act is working to their own benefit for first-aid to employees on the spot prevents serious complications, makes it possible to prevent layoffs from sickness, thus keeping men and women productive, and preventing damage suits.

And last, but not least, remember the 24% that can be cut off your liability insurance premiums by the installation of first-aid rooms.

Thomas First-Aid Room and Hospital Equipment is the most efficient and substantial equipment you can purchase for your mill first-aid room. Let our Southern Representative tell you the facts. Write to

Walter Scott,
Ottaray Hotel, Greenville, S. C.
F. H. THOMAS CO.,
691 BOYLSTON ST., BOSTON, MASS.



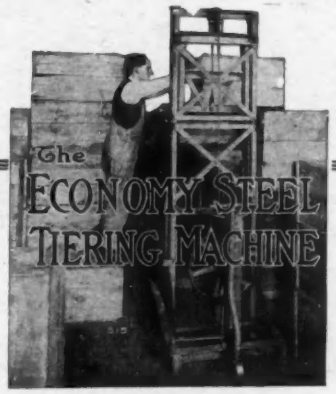
Drinking water in winter is as necessary as in summer time, But it must be dispensed in a sanitary manner.

A PURO Cooler with its PURO, JR. Fountain will keep your employees both healthy and happy.

Start a campaign now and clean out the "old tin drinking cup."

Install a PURO Cooler and thereby increase the productiveness of your employees.

PURO SANITARY DRINKING FOUNTAIN CO.
HAYDENVILLE, MASS.
E. S. PLAYER, Southern Sales Mgr.,
Masonic Bldg., Greenville, S. C.



Are Sales Off?

Are you storing your finished product ready to make "Immediate Delivery?"

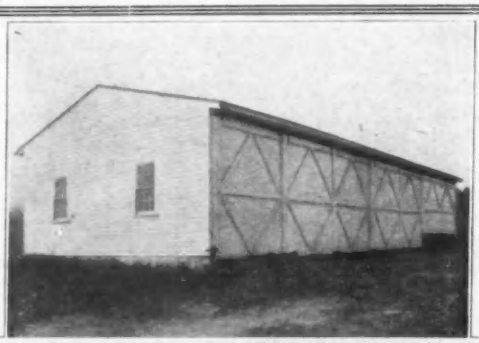
J. D. COLLINS

STORAGE EQUIPMENT
926 GRANT BLDG.,
ATLANTA, GA.

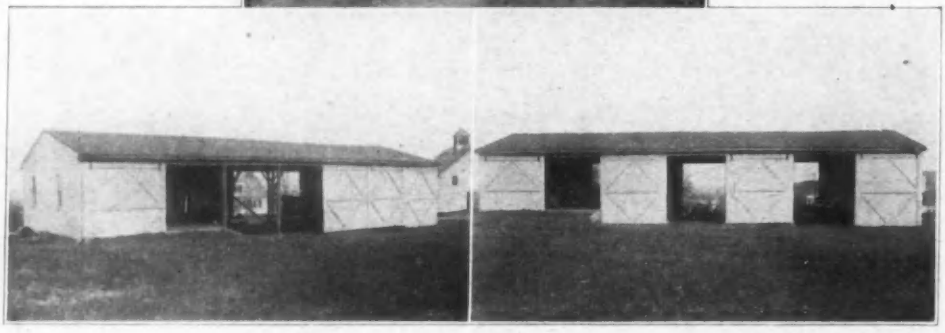
has the equipment that will reduce your storage and handling expenses. Tiering machines, Electric and hand trucks, Gravity and Power Conveyors of all kinds.

Catalogs and full information furnished upon request.

Use all the space in your warehouse



How much of your warehouse, or stores-building floor space is wasted because of improperly hung doors? The only way to reduce the money wasting, time losing extravagance of useless storage space, is to hang your warehouse doors to give you direct and quick entrance to any part of the space.



Let us show you how—
send for catalogue G-10.

Richards-Wilcox Mfg. Co.
A Hanger for any Door that Slides
CHICAGO ST. LOUIS LOS ANGELES PHILADELPHIA — AURORA, ILLINOIS, U.S.A. — BOSTON NEW YORK CLEVELAND — INDIANAPOLIS — MINNEAPOLIS — LONDON, ONT. — SAN FRANCISCO

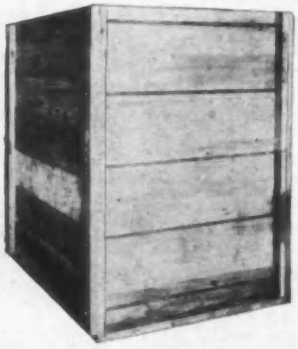
THIS
CONVINCING COMPARISON
SHOWS THE SUPERIORITY OF

SIGNODE SYSTEM

OVER THE USUAL BALE TIE.
LET US SEND YOU FULL DETAILS

SIGNODE SYSTEM, INC.
CHICAGO ATLANTA
Boston New York Philadelphia San Francisco Toronto

$\frac{5}{8}$" x .015 SIGNODE TIE	COSTS 12 % LESS PER FOOT	HOLDS UNDER 800 LBS. PULL	NO "SPIDER" TO INJURE HANDS
Compared with			
USUAL $\frac{5}{8}$" x .017 BALE TIE	COSTS 12 % MORE PER FOOT	BREAKS UNDER 500 LBS. PULL	DANGEROUS "SPIDER" OFTEN PRESENT



Cypress Tanks
Wooden Packing Cases
ALL STYLES

Manufactured from
GEORGIA PINE POPLAR CYPRESS
WHITE PINE and GUM

Your Inquiry Solicited

Hightower Box & Tank Co.
Corner Humphreys and Glenn Streets,
BOX 1025 ATLANTA, GA.

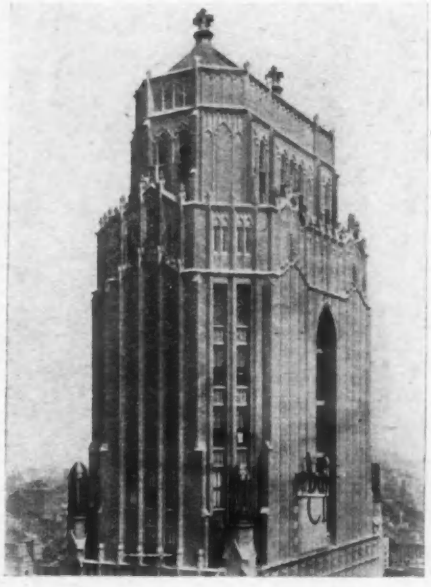
BUSH TERMINAL OFFICE BUILDING
42nd Street, near Broadway, New York

HELMLE & CORBETT - Architects
THOMPSON-STARRETT CO., Builders

THE trim of "SOUTH AMBOY" Terra Cotta is of soft gray color, except the recessed panels in Tracery which are executed in black matt Glaze to effectively emphasize the outlines at this great height.

The large Bush Terminal extensions on 41st Street are also trimmed with Terra Cotta of "South Amboy" manufacture.

THE SOUTH AMBOY TERRA COTTA CO.
150 Nassau St., N.Y. South Amboy, N. J.

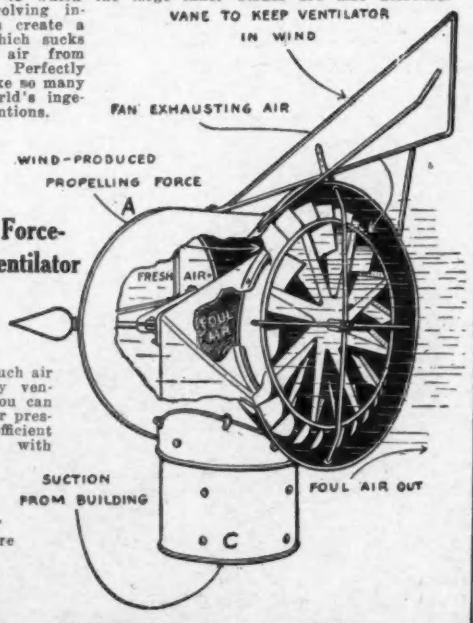


Detail of the 10 upper stories

Southern Office **LUKE SEAWELL,** 422 Austell Bldg., Atlanta, Ga.

The Wind-Mill Principle Applied to a Ventilator

Note the illustration! The fresh air passing over the funnel comes in contact with the small outer blades, thereby propelling the wheel to which the large inner blades are also attached. These revolving inner blades create a vacuum which sucks the foul air from below. Perfectly simple—sike so many of the world's ingenious inventions.



Carlisle Force-Draft Ventilator

displaces from 5 to 6 times as much air as ordinary ventilators. You can replace your present inefficient Ventilators with fewer and smaller sized "Carlisles" and get more ventilation! Write for descriptive folders.

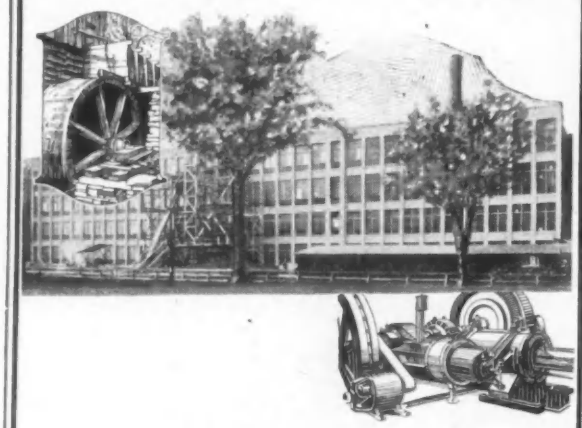
CARLISLE & GALE CO.
569-577 Albany St. Boston, 18, Mass.

Painting

LET us furnish estimates on your painting. We can refer you to scores of big mills throughout the United States that we have painted.

Write or phone us today.

H. NEWTON MARSHALL CO.
CONTRACTING PAINTERS
ATLANTA, GA. BOSTON, MASS.
D. R. Hall, Southern Manager
501 Trust Co. of Ga. Building, Atlanta, Ga.



Abreast of the cotton industry for 68 years

More than half a century has elapsed since the mills of the Bates Manufacturing Co. were erected at Lewiston, Me. In that time the growth of the cotton industry has made tremendous demands upon production. Machinery and methods that were modern 68 years ago are obsolete today.

Yet this plant has steadily kept pace with the industry it serves. Its manufacturing capacity has increased five-fold and right now it is up-to-date and efficient in every way.

It is by no miracle of original construction that this has been accomplished. The owners have regularly employed an engineering organization conversant with the needs of the textile industry to plan and supervise changes and additions in buildings and equipment. A healthy, natural increase in business has justified their policy.

Designed 68 years ago by a member of this firm, developed and re-modeled by our subsequent organization, this mill is today a tribute not only to the management and merchandising ability which has always characterized it, but also to the skill and enterprise of Lockwood, Greene & Co., Engineers.

BUILDING WITH FORESIGHT

LOCKWOOD, GREENE & CO.
ENGINEERS

EXECUTIVE OFFICE, 60 Federal Street, BOSTON
BOSTON ATLANTA CHICAGO NEW YORK
DETROIT CLEVELAND CHARLOTTE PHILADELPHIA
SANTIAGO, CHILE
LOCKWOOD, GREENE & CO. OF CANADA, LIMITED, MONTREAL
COMPAGNIE LOCKWOOD GREENE, PARIS, FRANCE

PAINT THAT POURS SUNSHINE INTO EVERY DARK CORNER

EVERY electric light burned when daylight might be used is costly waste. Every worker permitted to labor in semi-darkness is wasting energy, losing productivity and failing to get the utmost out of brain, hands and machine.

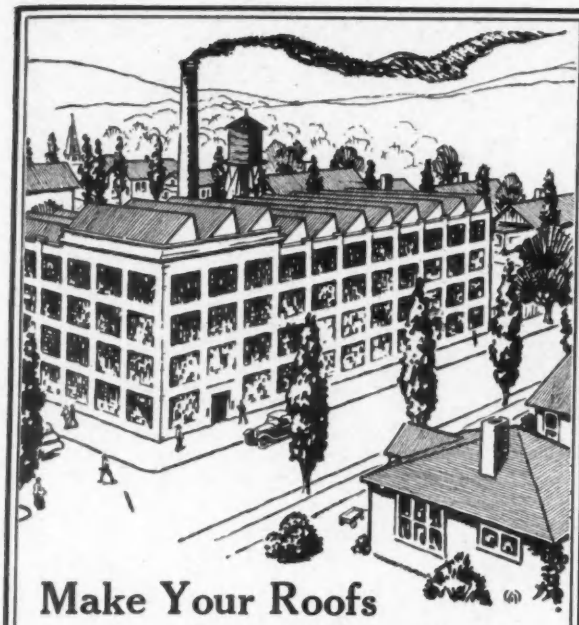
Hampden *Sunray* Mill White Oil Paint has solved the lighting problem in many a cotton mill. It has a hard, smooth, light-diffusing surface which distributes the rays entering the windows so that machines are bathed in daylight illumination from several directions.

Hampden *Sunray* Mill White is a long lived, washable paint having extraordinary covering and spreading capacity per gallon. It may be obtained directly from the Factory or from Local Dealers.

Send for "Whitest White"—
our interesting book on Mill
and Factory Lighting.

HAMPDEN PAINT & CHEMICAL CO.
Makers of Good Paint for 68 Years
Springfield **Massachusetts**

PAINT Hampden COATINGS



Make Your Roofs Last Years Longer

Bay State Roofing Stain is a beautifier and preservative for all asphalt shingle and composition roofs.

It prevents peeling and scaling. It acts as a powerful binder for those prepared roofings that have rough surfaces—disintegration or the rattling off of loose particles is impossible where Bay State is used.

It prevents the dullness of weathering, and will stand up under the hottest sun, the hardest rains, and the most exacting conditions. Bay State Roofing Stain has passed the severest possible tests with honors.

And in addition to adding years of life to a roof, Bay State makes it beautiful to look at. This perfect stain comes in dark red and dark green. Write for complete information and booklet entitled "Bay State Roofing Stain".

Brighten the interior of your mill, factory or warehouse with DIXIELITE, the perfect white finish for walls and ceilings.

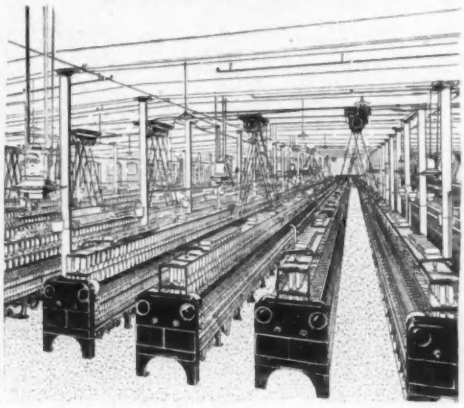
WADSWORTH, HOWLAND & CO., Inc.
Paint and Varnish Makers
Boston, Mass.

New York Office
Architects Bldg.

Philadelphia Office
1524 Chestnut Street

BAY STATE
Roofing Stain

"Made to Wear Where the Wear is Hardest"



Reflection--

The Cheapest Form of Light

To pick up and return (by reflection) light from dark corners requires the most *intense white.* It must be sufficiently *dense* or *opaque* in its nature to hide the surface if need be. It must be composed of such materials that age does not tend to change its *whiteness.*

The above qualities are a true description of

SCO-CO
Cotton White

"Makes the sun pay dividends"

We are in position to demonstrate that SCO-CO Cotton White (made in Flat, Eggshell and Gloss) delivers a greater percentage of light over a longer period of years than any similar product.

For more information about better paints, write—

THE SOUTHERN COTTON OIL CO.
Paint Products Division
SAVANNAH, GEORGIA

SCO-CO

SCO-CO

You'll do better Painting With "SCO-CO"

Cut Your Lighting Bills

Cut your lighting bills! Not by less light but by more daylight. Daylight is free. And it does not tire the eye of your workmen but adds to the general efficiency of your force.

Toco Mill White

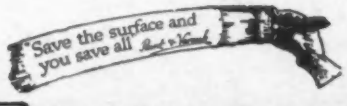
reflects the light from windows and skylights into every part of your factory. It lights up the dark corners that slow up production. It gives to your factory a bright, clean, cheerful appearance that adds to the comfort and well being of your employes.

This means greater production. Fewer mistakes. Less accidents.

Toco Mill White is specially prepared for interiors of industrial plants. The formula has been perfected through years of research and experience. It clings tightly to wood, brick or other surfaces. It flows out freely and has great covering capacity. It gives a smooth, even white finish that is both handsome and durable. Supplied in either flat or gloss, as you desire.

FREE Have your stenographer write your name and address on this ad for free book "Painting Profits Into Your Factory" and list of textile mills using Tropical products.

THE TROPICAL PAINT & OIL CO.
"The Firm that Serves with what Preserves"
Cleveland, Ohio



TROPICAL
Paints—Enamels—Roofing Materials

Factory, and Weave Shed with 42-foot Span, Concrete Saw-tooth Roof. Designed and constructed for Sidney Blumenthal & Co., Inc., at Shelton, Conn.

Expect the Utmost

THE Thompson & Binger organization is not new, nor old; not small, nor large. It is old enough to have acquired reputation, altho this reputation is not of such long standing that it need not be lived up to; its personnel is far too large to be designated small, but not so large that one of the two principals does not know the status of your job, every day.

You, as a client of Thompson & Binger, Inc., should expect the utmost in design and construction.

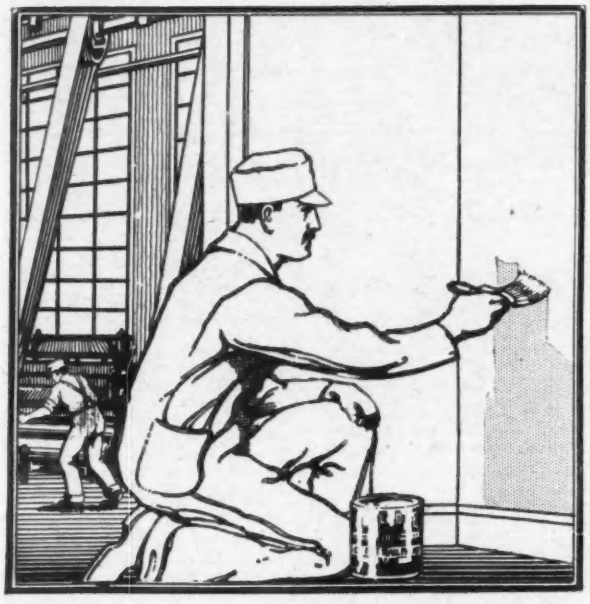
THE ENDICOTT-JOHNSON WORKERS have chosen us to do the designing, engineering, and construction of all concrete buildings to be erected by them.

THOMPSON & BINGER
INC.
ENGINEERS & CONTRACTORS
CONSULTATION - DESIGN - CONSTRUCTION

NEW YORK
280 MADISON AVE.

SYRACUSE
GURNEY BUILDING

CONCRETE



A Pure Mill White That Stays *White*

EVERY mill executive knows the value of good lighting conditions. A clean, bright, wholesome working place is worth dollars and cents in increased production and better workmanship. Paint the interior of your plant with

C-H PERMA-WHITE

A gloss mill white that stays white

Floods every nook and corner with daylight

C-H Perma-White stays permanently white because it does not easily collect dirt and will not discolor. Its smooth surface is easily washed. Figured by the years of service C-H Perma-White is very economical.

Our Charlotte Branch

is conveniently located to serve you. We carry in stock a complete line of Cooledge Hygrade Paints and Varnishes, as well as window and building glass of every description.

C-H Bungalow Shingle Stains
C-H House Paint
C-H Eggshell Wall Paint
Hygrade Lead & Oils
Window Glass
Ribbed Glass
Figured Glass
Plate Glass

COOLEDGE CH HYGRADE
Paints and Varnishes

F. J. COOLEDGE & SONS

ATLANTA — Oldest Manufacturers of pure paints, stains and varnishes in the South.

CHARLOTTE — Largest dealers of plate, window and building glass in the South.

SAVANNAH

NON-FLUID OIL

For Over 20 Years Mills Throughout the Country Have Used

TRADE MARK REGISTERED IN NON-FLUID OIL UNITED STATES PATENT OFFICE

Modern Textile Lubricants

No other lubricant has ever enjoyed so widespread and continued use in Textile Mills everywhere.

Here are some of its good points—

It won't drip or spatter
Saves goods from spoilage
Saves Lubricant from being wasted
Saves time in oiling
Yields more positive lubrication than oil because every particle is consumed in reducing friction because its lubricating quality is exceptional.
Builders of Textile machinery as well as leading mill operators all over the country recognize NON-FLUID OIL as the ideal lubricant for Textile Machinery.

A few selected grades used throughout your mill will give you better lubrication at less cost per month.

Just fill out the coupon and mail—it's the quickest way to get the free samples and Bulletin on the Lubrication of Textile Machinery.

New York & New Jersey Lubricant Co.

401 Broadway **New York**

Southern Agent:
Lewis W. Thomason,
Charlotte, N. C.

Ample Stocks at Our Branches
Atlanta, Ga.
Charlotte, N. C.
New Orleans, La.

N. Y. & N. J. Lubricant Co.
Please send Testing Samples and Bulletin on "Lubrication of Textile Machinery" to

Name .....

Address C-4-21

WHEN you change from belt to chain drive, change from plain to ball bearings.

They will eliminate bearing troubles sometimes incident to the change; will keep the shafts lined up perfectly; will save oil and power; are perfectly clean; and will save replacement from wear and tear that ruins plain bearings.

The ball bearings will be as great a source of satisfaction as the individual drive.

AldricH MachinE

Ball **WorkS** Bearings

Greenwood, S. C.

CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY

Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also proceed merit as surely in machinery as in men.

Time, skill and effort must also proceed merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort have endowed it with.

The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

CRESSON-MORRIS COMPANY

ENGINEERS—FOUNDERS—MACHINISTS

PHILADELPHIA, PENNA.

Branch Office, 141 Milk St., Boston, Mass.

20

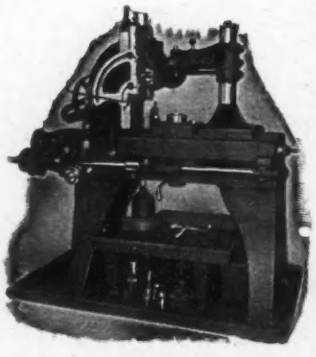
Full Automatic, Semi-Automatic and Hand Operated

Gear Cutting Machines

Especially adapted for use in Cotton Mills Hundreds now in use. Send for Special Circulars.

The D. E. Whiton Machine Co.,

NEW LONDON, CONN.



THE JOHNSON FRICTION CLUTCH

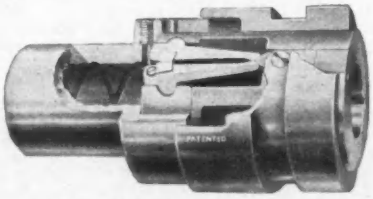
A Better Control for Textile Machinery

You will find the Johnson Clutch a most satisfactory means of driving textile machinery. More efficient and more convenient than the tight and loose pulley. Equally desirable on motor drives.

Made in both single and double types to fit standard pulley sizes. Clean, compact and durable. Grips smoothly and is easily adjusted to any tension.

Ask for the Johnson Clutch on your new machine equipment.

Ask for our Catalog "G"



Single Clutch Broken Away.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

Jenkins '96 Packing

Jenkins '96, a black packing, is compounded to form a sheet of great strength and durability, and is recommended for service where saturated steam is used, under all pressures, high and low—equally good for hot or cold water and other liquids.

It is flexible; will bend easily without cracking, and when used in a steam joint is pliable enough to yield readily to any unevenness of flange surfaces, yet strong enough to prevent blowing or squeezing out when under pressure. *Use Jenkins Compressed Asbestos Jointing for superheated steam.*

Ask your supply man

JENKINS BROS.

REG. U.S. PAT. OFF. TRADE JENKINS MARK Jenkins Bros

New York Chicago San Francisco
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Jenkins Packing

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ALLIGATOR

TRADE MARK REG. U.S. PAT. OFFICE

STEEL BELT LACING

Best for Every Type of Belting

Nothing Needed But a Hammer

The Strongest Belt Lacing On Earth

Double Staggered Teeth Insures Strong and Firm Grip

"Never Lets Go"

Reg. U.S. Pat. Office

The Choice of Master Engineers

ALLIGATOR Steel Belt Lacing is specified by Master Engineers the world over, because they have found it the most simple, efficient and economical medium for lacing all belts from tape to ⅝-inch thickness. Only a hammer required to apply it. Three minutes average time makes a permanent, flexible joint, with two working surfaces, that is stronger than any other known.

Investigate Alligator's Service Advantages. ALLIGATOR Steel Belt Lacing is sold by all good dealers and belting houses. Ask your preferred dealer, or write us for samples and prices.

Send for This Free Book

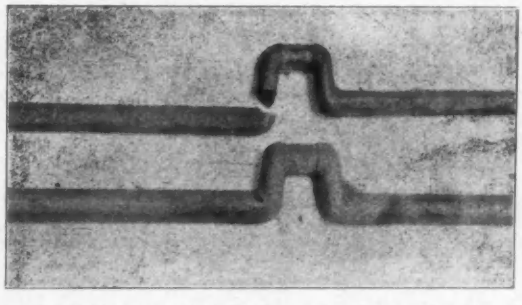
Our new book, "Short Cuts to Power Transmission," sent free upon request. Now in use in many technical and engineering schools. Every user of belting should have a copy. Write today for this valuable book.

FLEXIBLE STEEL LACING CO.

Manufacturers also of the famous FLEXCO-LOK Steel Lamp Guards.

4619 Lexington Street, Chicago, Ill., U. S. A.
135 Finsbury Pavement, London, E. C., England

What Would 125 New crank shafts have cost?



A CERTAIN cotton mill, in six months' time has made 125 broken crankshafts as good as new with their STANDARD welding apparatus, at costs of less than $2.00 each.

What would 125 new crank shafts have cost them?

Their welded crankshafts are giving as good or perhaps even better service than new ones, and just goes to prove that every cotton mill is not fully equipped without a

Standard Welding and Cutting Machine

We not only supply the machine, oxygen and supplies, but we send experts to your plant to teach your mechanics how to use it.

STANDARD SERVICE

means that if you have a breakdown too large for your own mechanic, our experts are always ready to come to you quickly

Write today for catalog and price list.

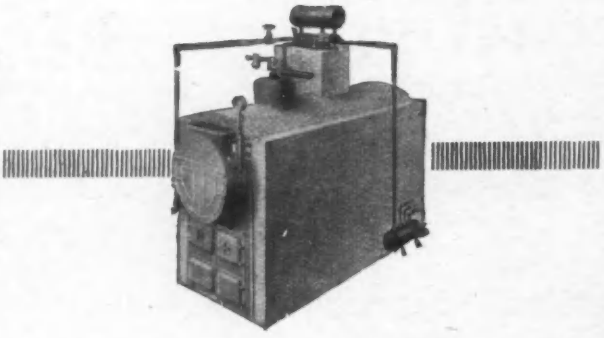
STANDARD GAS PRODUCTS CO.

INCORPORATED

Oxygen, Oxy-Acetylene Welding and Cutting Machines and Supplies.

Main Office, Atlanta, Ga.

Gretna, La. Chattanooga, Tenn.



How Much Fuel is Wasted in Your Plant?

With a per capita consumption of coal in 1907 of less than aix tons, the National Conservation Commission estimated the annual waste of three tons per capita—more than 300,000 tons.

"Last year," says Van H. Manning, until recently federal director of the Bureau of Mines, "the United States mined 600.000,000 tons of coal, and of this amount we wasted 150,000,000 tons, or 25 per cent through inefficient use."

Imperfect combustion and defective installations, of course, account for a large part of this waste—yet there are other leaks in boiler room operation which should be prevented.

Chief among them is the usual faulty, wasteful method of steam drainage and boiler feeding.

Only by draining steam heated equipment of all condensation as it forms can you expect efficient, economical operation of your steam heated machinery and apparatus.

And only by returning this condensation direct to your boilers—without cooling the boiling water to a temperature that permits the operation of a steam pump—can you reduce your fuel costs to the lowest possible minimum.

The Morehead Back-to-Boiler System is solving the steam drainage and boiler feeding problem in hundreds of plants because:

It automatically keeps away every ounce of condensation drained from steam heated equipment.

It returns the condensation to boilers as pure hot feed water—ready to be used again, and lowers fuel costs 20 to 50 per cent.

It removes the need for a steam pump altogether.

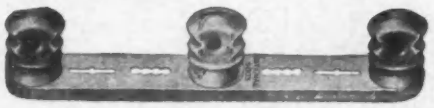
It can be easily added to your equipment without disturbing the operation of your power plant.

We will gladly refer you to textile manufacturers in your locality who have lowered their operating costs as much as 50 per cent with the Morehead System. Write for catalog.

MOREHEAD MANUFACTURING COMPANY
Detroit, Michigan

Canadian Morehead Mfg. Co. Woodstock, Ont.
For Dominion of Canada

Morehead
"BACK-TO-BOILER-SYSTEM"



"NATIONAL" BRACKETS

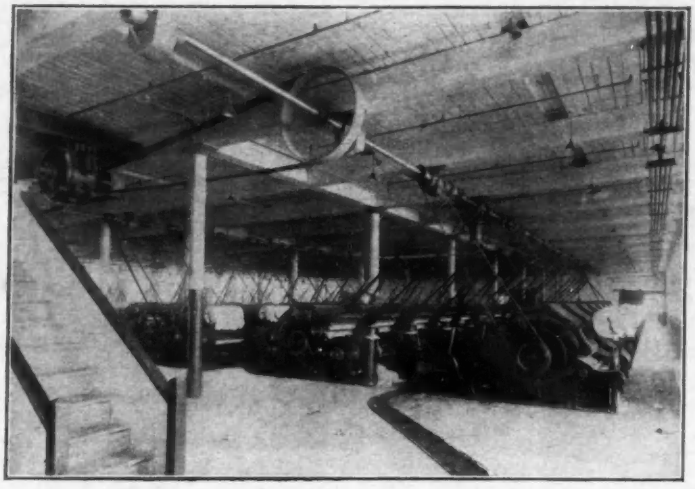
NATIONAL Brackets are especially adaptable for use in carrying power lines in industrial plants, as well as for outside construction work. They are practically univesral in application; they do not require tire wires; they are furnished complete with insulators. Write for Bulletin 602.

NATIONAL PRODUCTS N M M Co.

General Offices: Pittsburgh, Pa.

Atlanta Office:
Healey Building

Textile Motors



Allis-Chalmers

Textile Motors are the results of continued careful observation and study of motor application in the Textile Industry.

Write for Textile Bulletin

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

Speed in Service is Only Rivaled by Accuracy
Each Would Be Useless Without the Other

Unfailing Service

In the struggle and stress of modern business life every moment of delay represents a loss of time and money which cannot be regained.

When promptness, accuracy and dispatch are the vital elements in the delivery of electric equipment or supplies it is natural to turn to the Carter Electric Company for service.

This is an organization whose members are trained to meet the demands of any emergency and this organization is ready to serve you on an instant's notice.

If your requirements cover Rubber Conduit Wire, Switches, Safety Switches, Wiring Devices, Fuses, Lamps or other electric supplies, it is only a matter of a few hours before we can place them in your hands.

This is because our warehouses are always fully stocked—everything you may need and in large quantities—and with every modern facility for handling your business the Carter Electric Company pledges you **Unfailing Service.**

Carter Electric Company

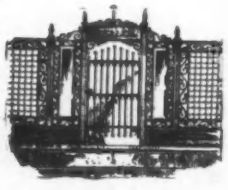
63 Peachtree Street, Atlanta

SOUTHERN BUSINESS DIRECTORY

CONSTRUCTION

American Roofing & Paint Co., Inc.
Dealers in
PAINTS, VARNISHES, STAINS,
ROOFING, ROOFING MATERIALS
Roofing Contractors——::——Painting Contractors
Office, 246 Decatur St. P. O. Box 1065
Atlanta, Ga.

Cast Iron Columns
FOR
COTTON MILL CONSTRUCTION
American Cast Iron Pipe Company
COLUMN DEPARTMENT BIRMINGHAM, ALA.
NEW YORK OFFICE: 261 BROADWAY



WIRE RAILINGS
WINDOW GUARDS
WIRE CLOTH
Established 1835.
DUFUR & CO.
309 N. Howard St., Baltimore, Md.

J. E. ROBBINS & SONS
PRACTICAL WELL DRILLERS
208 W. Coffee St.
P. O. Box 87 Phone: Long Distance 2985
Greenville, S. C.

GOODE CONSTRUCTION COMPANY
GENERAL CONTRACTORS
Charlotte, N. C.

GUDE & CO., Builders
CANDLER BLDG., - ATLANTA, GA.
All classes of buildings constructed promptly and efficiently and at reasonable prices.

COTTON, WASTE, LINTERS, Etc

E. A. CUTTS C. S. CUTTS, SR.
E. A. CUTTS COMPANY
Cable Address: "CUTTS"
COTTON BROKERS
30 Bay Street, East
Savannah, Ga.
Office Phones—478—2713—Postal Phone
Long Distance—9929
Branch Office: E. A. CUTTS & SON, Augusta, Ga.

WELDING & REPAIRS

SOUTHERN WELDING CO.
927 ELLIS ST. AUGUSTA, GA.
Located in the cotton manufacturing center. We make a specialty of cotton mill work. Give us your particular jobs.
Established 1911.

Advertising conserves the Manufacturer's time by acquainting him with a service or product at his leisure long before the need for such arises.

Commission Merchants, Yarn Dealers, Cotton Dealers and Brokers, Banks, Etc.

The Recognized Standards of Quality

COTTON YARNS

Gray Manufacturing Co.
Arrow Mills, Inc.
Parkdale Mills, Inc.
Flint Manufacturing Co.
Arkray Mills, Inc.
Arlington Cotton Mills
Myrtle Mills, Inc.

Our Fine Yarns Make Fine Fabrics

The manufacturers of a number of America's well known textile products can vouch for the strength, uniformity, cleanliness, and better weaving and knitting qualities of our yarns.

The yarns we spin for knitting, weaving, laces and converting, are furnished in all twists on skeins, cones, tubes and warps:

30s to 80s Single and Ply Combed Peeler Right Twist. 36s to 50s Single and Ply Double Carded Peeler, Right or Reverse Twist.

20s to 60s, 2, 3, and 4 Ply, Combed Peeler, Reverse Twist.

Our products are sold direct and exclusively through our General Sales Offices:
225 Fifth Avenue at 26th Street, New York.

H. A. FLORSHEIM, Sales Manager

Long Distance Phone: Madison Sq. 3472-3

BRANCH OFFICES { Boston, Philadelphia, Chicago

Weimar Bros.

Phone Connections
Works, 2046-48 Amber Street,
PHILADELPHIA, PA.

MANUFACTURERS OF

Cotton Mercerized Tapes, Spool Tapes, Bindings and Narrow Fabrics for Underwear and other Trades.

HUGHES FAWCETT

IMPORTER AND COMMISSION MERCHANT

LINEN YARNS

For Weaving, Knitting and all Purposes.

TURKEY RED YARNS

For Towel Borders, Towellings and Bleaching Cloth

Linen Jacquard Harness Twine

And Every Description of Linen Thread and Twine

115 Franklin Street, : NEW YORK

WOODWARD, BALDWIN & CO.

DRY GOODS

Commission Merchants

43-45 WORTH STREET, NEW YORK

Hunter Manufacturing & Comm. Co.

58-60 Worth St.

NEW YORK CITY U. S. A.

WORLD-WIDE DISTRIBUTOR OF COTTON FABRICS

COTTON FABRICS FOR HOME AND EXPORT

DOMESTIC BRANCH OFFICES

Boston	Chicago	San Francisco
Philadelphia	Cleveland	St. Louis
Baltimore	Kansas City	Greensboro

FOREIGN BRANCH OFFICES

Buenos Aires, Argentine	Curacao, D. W. I.	Caracas, Venezuela
	Santiago, Chile	
San Juan, Porto Rico	Havana, Cuba	Barranquilla, Columbia

The Accident *that* Founded *a* Giant Industry

IN a little Massachusetts town, with skeptical neighbors as an audience, Charles Goodyear vigorously expounded the possibilities of waterproofing with rubber—if the gum could be made resistant to heat and cold. In an emphatic gesture, his hand struck the hot stove. He dropped the lump of sulphur-mixed rubber gum clenched in his fist; it charred slightly but did not melt. He had accidentally discovered *vulcanizing,* the long sought process.

Since that fortunate day eighty-two years ago, New England has never lost her advantage as a leader in developing the wider use of rubber. Great factories in Massachusetts and Connecticut turn out two-fifths of the nation's rubber footwear. Many of the best known tire factories are located here, and they ship to every corner of civilization.

WRITE FOR COPIES OF OUR BOOKLETS:

Foreign Exchange
The Webb Law
The Edge Law
Acceptances
Scandinavia

THE NATIONAL SHAWMUT BANK is three years older than the vulcanized rubber industry, and has grown up with it—served its interests consistently and intelligently. From distant plantation to factory, and into all the markets of the world, Shawmut financing figures largely.

Inbound or outbound commerce pertaining to the rubber industry of the country can be handled with greatest economy by the bank that stands closest to the manufacturer, and that bank is SHAWMUT.

THE NATIONAL SHAWMUT BANK *of* BOSTON

Resources far exceed $200,000,000

IF YOU NEED BANKING SERVICE

in the South,
and especially in Georgia

You need The Citizens & Southern

Capital and Surplus $4,500,000

The Citizens & Southern system has completely equipped offices in Atlanta, Savannah, Macon and Augusta.

Each of these offices is connected with the others by direct private wires.

If you are a customer of either office, and want information or service of any kind from the other cities these wires and the complete organization are at your service.

Hundreds of direct correspondents all over the south makes it possible to give you practically the same service wherever you want it.

The Citizens & Southern Bank

Atlanta—Marietta at Broad

Savannah Macon Augusta

No account too large, none too small"

ESTABLISHED 1872

H. & B. BEER

NEW ORLEANS

HENRY BEER EDGAR H. BRIGHT
J. WILLIAM BARKDULL C. MORGAN ABRAMS

MEMBERS OF

New Orleans Cotton Exchange
New Orleans Future Brokers Association
New York Stock Exchange
New York Cotton Exchange
New York Coffee Exchange
New York Produce Exchange
Chicago Board of Trade

Associate Members of the Liverpool Cotton Association

Private Wires to Principal Points

WILLIAM ISELIN & CO.

COMMISSION MERCHANTS
—COTTON GOODS DEPARTMENT—
18 and 20 Thomas Street
NEW YORK

CARVER-BEAVER YARN CO.

Successors to A. D. SALKELD & BRO., Inc.
ALL NUMBERS COTTON MERINO **YARNS** ALL COLORS WOOL WORSTED
366 BROADWAY, NEW YORK

Perhaps we can give you the information

The superintendent of a mill wanted a lot of special corrugated paper boxes. We told him where he could get them.

Another superintendent wanted information as to where he might obtain some 2,000 horsepower of boilers. We gave him the names of several possible sources of supply.

So it goes. This service is free to readers of COTTON. We are always glad to be of assistance in filling your wants. Our files contain the names of manufacturers and dealers in every article or supply you can possibly want.

Let us help you find the things you need. Look first through the advertising pages of COTTON, then if what you want is not advertised write us.

We promise to give you immediate service. We know that we can be of assistance to you.

Cotton, Grant Bldg., Atlanta

1865 **Oldest National Bank in the Cotton States** 1921

The Atlanta National Bank

—and—

The One-Crop System

A one-crop system will not do for any section.

A prominent South Georgia farmer shipped to Atlanta in the Fall of 1918 and the Spring of 1919 one hundred and five cars of cattle and hogs, for which the farmers of his neighborhood received MORE THAN TWO HUNDRED AND TWENTY-FIVE THOUSAND DOLLARS.

Cotton was high when it was time to plant the 1919 crop. The farmers who had raised these cattle and hogs were attracted by the profit promised. THEY SOLD THEIR BREEDING STOCK, AND INVESTED THE RETURNS IN A GREATLY INCREASED COTTON ACREAGE.

Cotton prices slumped.

It is now impossible for these farmers to sell their cotton, raised at least in part, with the money received from the sale of their live stock, for enough to pay the cost of producing it.

This same farmer and stockman is our authority for the statement that ONLY THREE CARS OF HOGS HAVE BEEN SHIPPED FROM TERRELL COUNTY THIS YEAR.

Unable to sell cotton with no live stock to take its place, the farmer is naturally unable to take care of his obligations. The merchant in his town is unable to pay the jobber. The jobber can't pay the manufacturer, and the manufacturer shuts down his factory and THROWS OUT OF EMPLOYMENT THE PEOPLE WHO WOULD ORDINARILY BUY THE PRODUCTS OF THE FARMER.

The South Georgia county referred to is not an isolated instance.

What is true there is true in greater or less degree in every cotton-raising section.

It will continue to be true as long as cotton or anything else is raised to the exclusion of other crops.

DIVERSIFIED FARMING IS THE SOLUTION; AND UNTIL IT IS PUT INTO GENERAL PRACTICE THE SOUTH WILL CONTINUE TO HAVE PERIODS OF ABNORMAL PROSPERITY, INEVITABLY FOLLOWED BY CORRESPONDING PERIODS OF ABNORMAL DEPRESSION.

Fortunately, many counties of Georgia are diversifying their crops, and raising live stock in quantities sufficient to not only take care of the demand for home consumption, but to allow frequent shipments to the packing centers. These counties are prosperous today, and as their influence spreads THE ENTIRE SOUTH WILL BE PLACED IN A POSITION OF FINANCIAL INDEPENDENCE.

The Atlanta National Bank is proud of its record of assistance to Georgia farmers and Georgia industries and has complete confidence in their ability to succeed.

A consistent record of FIFTY-FIVE YEARS OF SERVICE has demonstrated the value of Atlanta National co-operation—you are invited to share it.

In the heart of Atlanta's business district—corner of Alabama and Whitehall—with SAVINGS DEPARTMENT on street floor.

The Atlanta National Bank

Active Designated Depository of the City of Atlanta, the County of Fulton, the State of Georgia and the United States Government

Textile Banking Company

Incorporated

Factors

FIFTY UNION SQUARE, NEW YORK

will undertake factoring contracts with manufacturers and selling agents, providing a service of credit approval which *eliminates* the credit risk, and obviates the expense, uncertainty and delays usually incident to collections.

The release of working capital through the immediate *cashing of accounts* approved by and *made payable to the Textile Banking Company*, enables manufacturers and selling agents to increase their volume of sales.

The Textile Banking Company has strong financial connections and its officers have had many years experience in the distribution and financing of textile lines.

Correspondence or interview invited.

Foundation of Credit

Common knowledge regarding a firm's credit standing not only is beneficial to the firm but constitutes the foundation of the entire structure of credit.

The vast credit operations of the National Bank of Commerce in New York are safeguarded by virtue of a highly organized research of those conditions and facts which justify or limit credit.

The benefit of our extensive credit experience is shared with our friends.

National Bank of Commerce in New York

Capital, Surplus and Undivided Profits
Over Fifty-five Million Dollars

Go to the American Cotton Manufacturers' Association

PHILADELPHIA, PA., MAY 30-31

VIA

THE DOUBLE TRACK ROUTE

Southern Railway—Pennsylvania R. R.

Leave Atlanta	12:15 A.M.	11:40 A.M.	12:50 P.M.	8:12 P.M.
Arrive Greenville	6:30 A.M.	5:05 P.M.	6:10 P.M.	8:50 P.M.
Arrive Spartanburg	7:55 A.M.	6:10 P.M.	7:20 P.M.	9.55 P.M.
Arrive Blacksburg	8:55 A.M.	7:15 P.M.	8:13 P.M.	10:48 P.M.
Arrive Gastonia	9:43 A.M.	8:05 P.M.	.....	11:40 P.M.
Arrive Charlotte	10:35 A.M.	8:50 P.M.	9:40 P.M.	12:25 A.M.
Arrive Greensboro	1:50 P.M.	11:45 P.M.	12:25 A.M.	3:28 A.M.
Arrive Washington	11:30 P.M.	8:45 A.M.	9:45 A.M.	12:25 P.M.
Arrive Philadelphia	4:15 A.M.	12.20 P.M.	1:12 P.M.	4:04 P.M.

For further information and Pullman reservations write nearest Passenger representative.

V. L. Estes,
District Passenger Agent,
Atlanta, Ga.

R. H. Graham,
Division Passenger Agent,
Charlotte, N. C.

R. C. Cotner,
District Passenger Agent,
Spartanburg, S. C.

A. J. Lee,
City Passenger & Ticket Agent,
Greenville, S. C.

"The Southern Serves the South"

GEORGIA RAILROAD

the direct route to Eastern Carolina and Virginia points.

Through standard steel sleeping cars to Augusta, Columbia, Charleston and Wilmington. Over night ride, "that's all."

See that your ticket reads via

GEORGIA RAILROAD

If you want fast freight service from Atlanta, Augusta, Macon and Athens to points East, and vice-versa, have it routed

GEORGIA RAILROAD

and it will be handled with dispatch and your patronage will be appreciated.

GEORGIA RAILROAD

with its various departments, is at your service if you want to purchase a farm, erect a sweet potato curing house, locate a dairy or find a suitable location for an industry, our Commercial Development Department can supply your wants.

For further information communicate with the various Department heads.

J. P. BILLUPS,
General Passenger Agent,
ATLANTA, GA.

MR. G. E. BOULINEAU,
General Freight Agent,
ATLANTA, GA.

MR. E. S. CENTER, Manager,
Commercial Development Department,
ATLANTA, GA

CLASSIFIED ADVERTISING

Wanted
SALES MANAGER

Nationally known firm of Oil Manufacturers wants a live-wire to take charge of department for sale of Oil Products such as Softeners, Soluble Oils, Soluble Tallows, etc., to textile trade. Thorough knowledge of sale and application of such products necessary. Ground floor proposition to man big enough to handle department on nominal salary and profit sharing basis. Do not reply unless you are qualified to earn $5,000 or more. State age, qualifications and experience. Address "Confidential," care COTTON, Atlanta, Ga.

PROPOSALS FOR INDIAN SUPPLIES: Department of the Interior, Office of Indian Affairs, Washington, D. C., Mar. 25, 1921. SEALED PROPOSALS, plainly marked on the outside of the sealed envelope: "Proposal for Groceries" (or other class of supplies as the case may be) and addressed to the "Commissioner of Indian Affairs, 3940 South Ashland Ave., Chicago, Ill.," will be received until 10 o'clock a. m., on each of the following dates and on the class of supplies specified, and then opened. Clothing and Piece Goods, May 3, 1921; Dry Goods, May 10, 1921; Underwear, Hosiery, Gloves, Suspenders, Hats and Caps, May 3, 1921; Notions, May 7, 1921; Groceries, May 7, 1921; Agricultural implements, Wagons, etc., May 12, 1921; Schoolbooks, etc., May 5, 1921; Chinaware, etc., May 5, 1921; Automobile supplies, May 3, 1921. Schedules covering all necessary information for bidders will be furnished upon application to the Indian Office, Washington, D. C., or the U. S. Indian Warehouses at Chicago, St. Louis and San Francisco. The Department reserves the right to reject any or all bids or any part of any bid, and to post tentative awards promptly, subject to correction. CATO SELLS, Commissioner.

Wanted—Salesmen.

Salesmen calling on the textile mills, and interested in new lines of machinery, paints, building ing supplies or chemicals, either as a side line or exclusively will find it profitable to write, giving experience, territory covered and other details. Correspondence strictly confidential. Cotton 1021 Grant Building, Atlanta, Ga.

RATES:

DISPLAYED.

"For Sale" and all other advertisements using bold-face type or otherwise displayed, $2.00 per inch per insertion.

Rates for larger spaces furnished on application.

WITHOUT DISPLAY.

"Positions Wanted" 3 cents per word per insertion. Minimum charge 50 cents. Payable in advance.

"Positions Open" and other undisplayed advertisements, 4 cents per word per insertion. Minimum charge $1.00. Payable in advance.

(*When replies are to be received in our care, allow four words for box address,*)

FOR SALE

New Weaving Outfit, consisting of 60 Model "D" Modified Draper Looms, 44-inch reed space, individual motor drive; No. 90 Universal Winders; Standard Direct Beaming Outfit; Humidifier System; Cloth Brusher; supplies, etc.

This equipment has been used less than one year, is just like new. Everything latest type. The price is a money saver.

Also 5 New Kilburn & Lincoln Webbing Looms, weaving up to 5 inches in width.

P. O. Box 974, Atlanta, Ga.

New and Second Hand

ENGINES

Corliss Automatic and Slide Valve

BOILERS

Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS

Lathes, Planers, Shapers, Drill Presses, etc.

WOOD WORKING

Planers, Molders, Band Saws, etc.

ELEC. MACHINERY

Dynamos and Motors

AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,

127-31 N. Third St.

Philadelphia, - Pennsylvania

INDUSTRIAL ENGINEERING SERVICE

Industrial Engineers offer complete service in design and construction of Textile Mills, warehouses, mill villages, power plants, etc. We can assist in financing meritous enterprises. Give full particulars when writing. Box 29 care COTTON, Atlanta, Ga.

Have You?

Have you any proposition to put before the executives in the textile mills of the South? Anything to sell or buy that they may want or have? Do you want a better position or do you want a good man to fill a position?

Whatever your message, this "Classified Opportunities" section of COTTON is the logical place for the announcement of your requirements.

It's the meeting place for Employer and Employee, and a good salesman in print for anything you want to dispose of.

A little ad won't cost much. Try it for a month or so.

Buyers' Index

Acetylene Welding Apparatus.
(See Welding Apparatus).

Acetylene Gas.
Commercial Acetylene Supply Co.
Southern Welding Co.
Standard Gas Products Co.

Accountants.
(See Auditors and Accountants).

Adding Machines.
Monroe Calculating Mch. Co.

Air Brakes.
Allis-Chalmers Mfg. Co.

Air Washers.
American Blower Co.
Carrier Eng. Corp.
Parks-Cramer Co.
Sturtevant Co., B. F.

Air Conditioning Systems.
(See Humidifying Apparatus).

Albone.
Roessler & Hasslacher Chemical Co.

Alkalies.
(See Dyestuffs and Chemicals).

Aniline Colors.
(See Dystuffs and Chemicals).

Anti-Chlornie.
(See Dyestuffs and Chemicals).

Aprons-Rub.
Smith & Furbush Machine Co.

Architects and Engineers.
American City Eng'g Co.
Herne System.
Lockwood, Greene & Co.
Robert & Co.
Spiker & Lose.
Sirrine, J. E.
Thompson & Binger, Inc.
Tufts Co., Arthur.

Ash Handling Machinery.
(See Coal Handling Machinery).

Asphalt Slate Shingles.
(See Slate Asphalt Roofing).

Auditors and Accountants.
American Audit Co.
Ernst & Ernst.

Auto Trucks.
(See Trucks—Auto).

Automatic Controllers (Temperature).
(See Temperature Controllers.)

Automatic Loom Attachments.
(See Loom Attachments).

Automatic Feeds for Cotton.
Proctor & Schwartz, Inc.
Saco Lowell Shops.
Sargent's Sons Corp., C. G.
Smith & Furbush Mch. Co.
Whitin Mch. Works.

Automatic Guider (Electric).
Blake Electric Mfg. Co.

Backwashers.
Sargent's Sons Corp., C. G.

Automatic Scales.
(See Scales).

Ball Bearings.
Aldrich Mch. Works.
Campbell Mfg. Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
S K F Industries.
U. S. Ball Bearing Co.

Ball Bearing Housings.
Aldrich Mch. Works.
Fafnir Bearing Co.

Ball Bearing Top Rolls.
Campbell Mfg. Co.

Bale Band Buckles.
(See Box Strapping & Buckles).

Bale and Box Ties.
Lovingood Co.
Regnas Co., J. R.
Signode System, Inc.

Baling Machines.
Crompton & Knowles Loom Wks.
Draper Corporation.
Economy Baler Co.
Galland-Henning Mfg. Co.
Williams & Sons, I. B.
Hulme, J. S.
Saco-Lowell Shops.

Baling Presses.
(See Presses).

Bandages, Tapes, Etc.
American Textile Banding Co.

Bands.
(See Tapes).

Banding Straps and Buckles.
Lovingood Co.
Regnas Co., J. R.
Signode System, Inc.

Bands (Self-Tying).
Campbell Mfg. Co.

Banks.
Atlanta National Bank.
Citizens & Southern Bank.
Irving National Bank.
National Bank of Commerce In New York.
National Shawmut Bank.
Textile Banking Co., Inc.

Barometers (Mercurial).
Taylor Instrument Co.

Barrels—Fibre.
(See Fibre Products).

Baskets—Mill.
(See Boxes—Mill).

Bath Cabinet—Shower.
Crane Co.
Manufacturing Equipment & Engineering Co.
Sanymetal Products Co.

Batteries (Elec.).
(See Storage Batteries).

Beam Dyeing Machines.
Cocker Mchry. & Foundry Co.

Beaming and Warping Mchry.
(See Warpers and Warping Machinery).

Bearings.
Cresson-Morris Co.
Diamond State Fibre Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
S K F Industries.
U. S. Ball Bearing Co.
Wood's Sons Co., T. B.

Belting.
American Supply Co.
Augusta Mill Supply Co.
Russell Mfg. Co.
Walraven Co.
Williams & Co., I. B.

Belting—Chain Link.
Link-Belt Company.
Morse Chain Co.

Belting—Rope.
(See Rope Transmission).

Belt Conveyors.
Link-Belt Company.
Mathews Gravity Carrier Co.
Morse Chain Co.
Portable Machinery Co.

Belt Dressing.
Jos. Dixon Crucible Co.
Walraven Co.
Williams & Co., I. B.

Belt Fasteners.
Flexible Steel Lacing Co.

Belt Lacing.
Augusta Mill Supply Co.
Flexible Steel Lacing Co.
Walraven Co.

Belt Tighteners.
Link-Belt Company.
Williams & Sons, I. B.
Wood's Sons Co., T. B.

Benches (Park and Playground).
(See Playground Equipment).

Bleacheries.
(See Dyers, Bleachers and Finishers).

Bleaching Kiers.
Butterworth & Sons Co., H. W.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Machinery Co., The.

Bleaching Machinery.
(See Dyeing, Bleaching and Finishing Machinery).

Bleaching, Finishing and Sizing Materials.
(See Finishing Materials).

Blowers and Blower Systems.
American Blower Co.
Carlisle & Gale Co.
Carrier Eng. Corp.
General Electric Co.
Perkins & Son, B. F.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

Boards—Fibre.
Diamond State Fibre Co.

Boards—Form.
Pearson, Jos. T.

Bobbins.
Draper Corporation.
Greenville Spool & Mfg. Co.
Jordan Mfg. Co.
Shambow Shuttle Co.
Walraven Co.
Whitin Machine Works.

Bobbin Heads.
Diamond State Fibre Co.

Boilers.
International Engineering Works, Inc.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Boiler Feed Water Purification.
American Water Softener Co.
Borromite Co. of America.
Hulme, J. S.
Permutit Co.
Scaife & Sons, Wm. B.

Boiler Room Fittings & Supplies.
Crane Co.
Detroit Stoker Co.
Grinnell Co., Inc.
International Engineering Co.
Jenkins Bros.
Lunkenheimer Co.
Nashville Industrial Corp.
Sherwood Mfg. Co.

Boiler Grates and Stokers.
(See Grates and Stokers).

Boiler Graphite.
Jos. Dixon Crucible Co.

Bookkeeping Machines.
Monroe Calculating Mch. Co.

Box Strapping and Tie Buckles.
(See Banding Straps & Buckles).

Boxes—Mill.
Diamond State Fibre Co.
Hightower Box & Tank Co.
Keystone Fibre Co.
Lane & Bros., W. T.
Standard Fibre Co.

Boxes—Packing.
(See Packing Boxes).

Braid.
(See Tapes).

Brake Linings.
Diamond State Fibre Co.

Brazing.
(See Welding).

Brokers—Cotton.
(See Cotton Dealers & Brokers).

Brokers—Stock.
(See Stocks and Bonds).

Brooms.
(See Brushes.

Brushes—Mill.
Atlanta Brush Co.
Southern Brush & Broom Co.

Brushes—Commutator.
Dixon Crucible Co., Jos.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Buckets and Pails—Mill.
Keystone Fibre Co.
Standard Fibre Co.

Buckets—Elevator and Grab.
Link-Belt Company.

Buckles—Cotton Tie.
(See Box Strapping and Ties).

Building Contractors.
(See Contractors).

Buildings—Portable.
Seawell, Luke.

Building Material.
American Cast Iron Pipe Co
American Roofing & Paint Co.
Anchor Post Iron Works.
Atlantic Drier & Varnish Co.
Barrett Co., The.
Birmingham Slag Co.
Detroit Steel Products Co.
Dufur & Co.
Grinnell Co., Inc.
Kirkpatrick Lumber & Timber Co.
Lockwood, Green & Co,
Sanymetal Products Co.
Seawell, Luke.
Southern Cotton Oil Co.
Southern Cypress Mfg. Asso.

Bungalows.
(See Houses—Ready Built).

Burr Pickers.
Sargent's Sons, C. G.
Smith & Furbush Machine Co.

Bushings.
Diamond State Fibre Co.
Southern Spindle & Flyer Co.
Shambow Shuttle Co.
Walraven Co.

Cabinets.
(See Lockers).

Calculating Machines.
Monroe Calculating Mch. Co.

Calenders.
Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co.

Calender Rolls.
Campbell Mfg. Co.
Butterworth & Sons Co., H. W.
Roy & Son, B. S.
Perkins & Son, Inc., B. F.
Textile Finishing Machinery Co.

Calling System—Inter-Telephone.
Carter Electric Co.

Cans—Roving.
Diamond State Fibre Co.
Keystone Fibre Co.
Standard Fibre Co.

Canvas Lugs.
Augusta Mill Supply Co.

Cars and Trucks—Fibre.
(See Trucks).

Car Unloaders.
Portable Machinery Co.

Carbonizing Machines.
Cocker Mch. & Fdry Co.
Klauder-Weldon Dyeing Mch. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Salem Iron Wks.
Sargent's Sons & Co., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Mch. Wks.

Carding Machinery and Supplies.
Howard Bros. Mfg. Co.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Card Clothing.
Howard Bros. Mfg. Co.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Card Feeds.
Schofield, Wm. Co.
Smith & Furbush Mach. Co.
Whitin Machine Co.

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WASTE BASKETS
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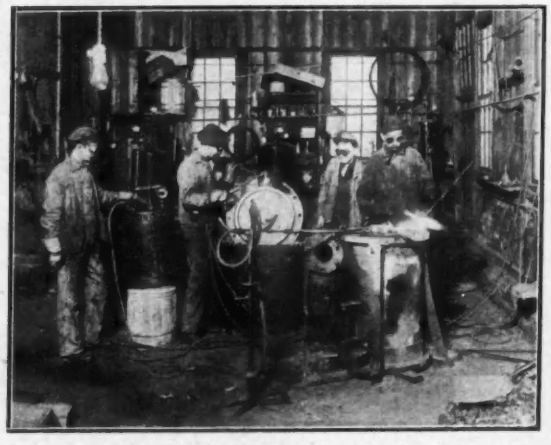

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Card Grinding Machinery.
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Carpet Machinery.
Butterworth, H. W., & Sons Co.
Crompton & Knowles Loom Wks.
Proctor & Schwartz, Inc.
Schofield, Wm. Co.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Carrier Aprons.
(See Aprons).

Carrier System.
Mathews Gravity Carrier Co.

Cases—Wooden.
(See Boxes).

Casement Window Hardware.
Richards-Wilcox Mfg. Co.
Seawell, Luke.

Castings.
American Cast Iron Pipe Co.
Cresson-Morris Co.
Lombard Foundry & Mch. Co.
Walsh & Weidner Boiler Co.

Cast Iron Columns.
American Cast Iron Pipe Co.

Caustic Soda.
(See Bleaching Materials).

Cement Machinery.
Allis-Chalmers Mfg. Co.

Cement Reinforcement.
Birmingham Slag Co.

Cement and Brick Coating.
Cooledge & Sons, F. J.
Dixon Crucible Co., Jos.
Peaslee-Gaulbert Co., Inc.
Patterson-Sargent Co.
Tropical Paint Co.
Wadsworth Howland & Co., Inc.

Centrifugals.
Cresson-Morris Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Mch. Wks.

Chain Drives.
(See Belting—Chain Link).

Chain—Block, Bicycle, Auto, Engine, Agricultural, Etc.)
Morse Chain Co.

Chairs and Stools.
Manufacturing Equipment & Engineering Co.
Monarch Theatre Supply ICo.
Southern Theatre Equip. Co.

Chemicals.
(See Dyestuffs and Chemicals).

Chlorine Gas.
Electro Bleaching Gas Co.

Cleaning Machine—Suction.
United Electric Co.

Clocks—Hank, Etc.
(See Counters).

Clocks—Time.
Eco Clock Co.
Service Recorder Co.

Clocks—Watchman.
Boston Machine Works.
Eco Clock Co.
Chicago Watchman Clock Co.

Closets—Water.
(See Toilets).

Cloth Cutters.
Firsching, J. A.
Wildman Mfg. Co.

Cloth Guider (Electric).
Blake Electric Mfg. Co.

Cloth Room Machinery.
Butterworth, H. W., & Sons Co.
Firsching, J. A.
Saco-Lowell Shops.
Scott & Co., Henry L.
Textile Finishing Machinery Co.
Wildman Mfg. Co.

Cloth Shrinking Machinery.
Reliance Machine Works.
Tolhurst Mch. Wks.

Cloth Testers.
Scott & Co., Henry L.

Cloth Winders.
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Clutches—Friction.
Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
Link-Belt Company.
Wood's Sons Co., T. B.

Clutch Linings.
Diamond State Fibre Co.

Coal.
U. S. Fuel Corp.

Coal & Ash Handling Machienery.
Link-Belt Company.
Portable Machinery Co.

Coal Tar Disinfectants.
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Cocks.
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Color Pails.
(See Buckets—Mill).

Color Testers.
Atlas Electric Devices Co.

Comb Aprons.
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Commission Merchants & Dealers.
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Compressors—Air.
Allis-Chalmers Mfg. Co.
General Electric Co.
Walraven Co., The.

Concrete Reinforcement.
Birmingham Slag Co.

Condensers.
Allis-Chalmers Mfg. Co.

Conduits.
Diamond State Fibre Co
National Metal Molding Co.

Conduiets.
Crouse-Hinds Co.
National Metal Molding Co.

Connectors—Frankel Solderless.
Westinghouse Elec. & Mfg. Co.

Consulting Engineers.
(See Architects and Engineers).

Contractors and Engineers—Building.
Aberthaw Construction Co.
American City Eng'g Co.
Fonda Organization, The E. A.
Goode, R. L.
Gude & Co.
Hearne System.
Robbins & Sons, J. E.
Sniker & Lose.
Thompson & Binger.
Tufts Co., Arthur.

Contractors—Electrical.
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Contractors—Painting.
American Roofing & Paint Co.
Marshall Co., H. Newton.

Contractors (Piping.)
Marshall Co., H. Newton.

Contractors (Roofing.)
American Roofing & Paint Co.
Marshall Co., H. Newton.

Controlling Instruments—Temperature.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.

Conveyors—Belt.
(See Belt Conveyors).

Conveying Machinery.
American Supply Co.
Collins, J. D.
Cresson-Morris Co.
Hulme, J. S.
Link-Belt Co
Mathews Gravity Carrier Co.
Morse Chain Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Portable Machinery Co.
Richards-Wilcox Mfg. Co.
Schofield, Wm. Co.
Standard Conveyor Co.
Walraven Co.

Conveyors—Portable.
Portable Machinery Co.

Coolers.
(See Humidifying Apparatus.)

Coolers—Water.
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Cooling Towers.
(See Tanks and Towers).

Copper Stamps and Stencils.
(See Stamps, Stencils, Etc.)

Cordage Machinery.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Cotton Yarn and Cloth Commission Merchants and Dealers.
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes.
Florsheim, H. A.
Hunter Mfg. & Comm. Co.
Iselin & Co., Wm.
Weimar Bros.
Woodward Baldwin & Co.

Cotton Dealers and Brokers.
Beer, H. & B.
Cutts, E. A.

Cotton Mill Machinery and Supplies.
Augusta Mill Supply Co.
Barber-Colman Co.
Blake Electric Mfg. Co.
Boston Machine Works Co.
Butterworth & Sons, H. W.
Cocker Mach. & Foundry Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Firsching, J. A.
Fletcher Works.
Greist Mfg. Co.
Greenville Spool & Mfg. Co.
Howard Bros. Mfg. Co.
Howard & Bullough.
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Proctor & Schwartz, Inc.
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Schaum & Uhlinger.
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Service Recorder Co.
Shambow Shuttle Co.
Slaughter Mchry. Co., G. G.
Smith & Furbush Mach. Co.
Southern Bending Co.
Steel Heddle Mfg. Co.
Terrell Machine Co.
Textile Fininshing Machinery Co
Tolhurst Mch. Wks.
Universal Winding Co.
Walraven Co.
Whitin Machine Works.
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Cotton Tape Loom.
Fletcher Works.
Schaum & Uhlinger.

Cotton Yarn Mills.
(See Yarn Manufacturers).

Counters—Revolution, Hank, Pick, Etc.
Boston Machine Works.
Slaughter, G. G.

Counters (Time).
Service Recorder Co.

Counters—Restaurant.
(See Restaurant Equipment.)

Coupling—Shaft.
Cresson-Morris Co.
Wood's Sons Co., T. B.

Covers—Rollers.
Diamond State Fibre Co.

Cranes.
(See Hoists).

Crayons.
Dixon Crucible Co., Jos.
Lovingood Co.
Lowell Crayon Co.
Regnas & Co., J. R.

Crushing Machinery.
Allis-Chalmers Mfg. Co.

Cutters—Cloth.
(See Cloth Cutters).

Cypress Lumber.
Southern Cypress Mfg. Asso.

Cutters—Thread.
(See Thread Cutters).

Dehumidifying.
Sturtevant Co., B. F.

Delivery Cases.
(See Boxes—Packing).

Dial Scales.
(See Scales).

Dies—Steel.
(See Stamps, Stencils, Etc.).

Discs—Fibre.
Diamond State Fibre Co.

Dishes and Glassware.
Chattanooga Queensware Co.
Pick & Sons, Albert.

Disinfectants.
Barrett Co., The
Sanitas Co.

Dobby Chains.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

Doffing Boxes—Mill.
(See Boxes—Mill).

Doffing Cars.
(See Cars).

Door Closers and Checks.
Richards-Wilcox Mfg. Co.
Seawell, Luke.

Door Hangers.
Richards-Wilcox Mfg. Co.

Door Mats—Steel.
Lovingood Co.
Regnas & Co., J. R.

Draft Gauges.
(See Gauges—Draft).

Drawing Frames.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Drills—Electric.
(See Electric Machinery).

Drinking Fountains.
(See Fountains—Drinking).

Drop Wires.
Greist Mfg. Co.
Steel Heddle Mfg. Co.

Drying Apparatus.
American Blower Co.
Sturtevant Co., B. F.

Drying Forms—Hosiery.
Pearson, Jos. T.

Drying Machinery.
American Laundry Mchry. Co.
Butterworth, H. W., & Sons Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

Dust Collectors.
(See Blowers and Blowing Systems).

Dusting Machinery.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Dyers, Bleachers and Finishers.
American Processing Co.
Franklin Process Co.
King, Habersham.

Dyeing, Bleaching, Finishing and Printing Machinery.
American Laundry Mchry. Co.
Atlas Electric Devices Co.
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
Electro Bleaching Gas Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
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Klauder-Weldon Dyeing Mch. Co.
Permutit Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Rome Mch. & Fdry. Co.
Salem Iron Wks.
Schaum & Uhlinger.
Textile Finishing Machinery Co. The.
Tolhurst Machine Works.

Dyeing Machines (Package and Spool.)
Franklin Process Co.

Dye Sticks.
Phila. Drying Machinery Co.

Dyestuffs and Chemicals.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Atlantic Dyestuff Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Du Pont de Nemours & So., E. I.
Electro Bleaching Gas Co.
Ford Co., J. B.
Kali Mfg. Co.
Klipstein & Co., A.
Lewis, John D.
Metz & Co., H. A.
National Aniline & Chemical Co.
Newport Chemical Works, Inc.
Roessler & Hasslacher Chemical Co.
Southern Distributing Co.
Surpass Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques.
Zavon Co., Inc.

Electric Cleaning System—Suction.
United Electric Co.

Electric Conduit & Fittings.
National Metal Molding Co.

Ejectors.
Sherwood Mfg. Co.

Electric Dynamos and Motors.
(See Motors and Generators).

Electric Fans.
(See Fans—Electric).

Electric Lamps.
(See Lamps).

Electric Lamp Guards.
Flexible Steel Lacing Co.

Electrical Engineers and Contractors.
Huntington & Guerry, Inc.

Electrical Machinery and Supplies.
Allis-Chalmers Mfg. Co.
Atlas Electric Devices Co.
Blake Electric Mfg. Co.

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BUYERS' INDEX—Continued.

Carter Electric Co.
Cooper-Hewitt Elec. Co.
Crouse-Hinds Co.
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Slaughter Mchry. Co., G. G.
United Electric Co.
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Walsh & Weidner Boiler Co.
Westinghouse Elec. & Mfg. Co.

Electric Tractors and Trucks.
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Elevators—Portable.
Collins, J. D.
Lovingood Co.

Elevators.
Link-Belt Company.
Mathews Gravity Carrier Co.
Standard Conveyor Co.

Enamel—Mill White.
(See Paint).

Engineers—Mill.
(See Architects).

Engines—Oil, Gas and Gasoline.
Walraven Co., The.

Engines—Steam.
Allis-Chalmers Mfg. Co.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Sons Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Engine Room Appliances and Supplies.
Crane Co.
Cutter Works, George.
Jenkins Bros.
Lunkenheimer Co.
Nashville Industrial Corp.
Slaughter Mchry. Co., G. G.
Sherwood Mfg. Co.
Walraven Co.
Westinghouse Electric & Mfg. Co.

Exporters—Cotton.
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Extractors—Hydro.
American Laundry Mchry. Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.

Fans—Electric.
Allis-Chalmers Mfg. Co.
American Blower Co.
Carter Electric Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Fans—Conveying, Power and Exhaust.
(See Blowers and Blowing Systems).

Fasteners—Belt.
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Feed Water Purifiers.
(See Boiler Feed Water Purification).

Felting Machinery.
Smith & Furbush Mch. Co.

Fence—Steel and Iron.
American Cast Iron Pipe Co.
Anchor Post Iron Works.
Cyclone Fence Co.

Fibre Products.
Diamond State Fibre Co.
Keystone Fibre Co.
Standard Fibre Co.

Fillets (Calender and Doffer, Strippers, Burnishing and Emery.)
Howard Bros. Mfg. Co.

Filters—Water.
American Water Softener Co.
Borromite Co. of America.
Hulme, J. S.
Permutit Co.
Scaife & Sons Co., Wm. B.

Filters—Oil Removal.
Permutit Co.
Sherwood Mfg. Co.

Filters—Sand.
Permutit Co.

Films (Moving Picture).
Monarch Theatre Supply Co.
Southern Theatre Equip. Co.

Finishing.
(See Dyers, Bleachers and Finishers).

Finishing, Bleaching and Sizing Materials.
Atlantic Dyestuff Co.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Corn Products Refining Co.
Dobbins Soap Mfg. Co.
Du Pont de Nemours & Co., E. I.
Electric Smelting & Alum. Co.
Electro Bleaching Gas Co.
Ford Co., J. B.
Kali Mfg. Co.
Keever Starch Co.
Klipstein & Co., A.
National Aniline & Chemical Co.
Newport Chemical Works.
Metz & Co., H. A.
Rock Glen Salt Co.
Roessler & Hasslacher Co.
Southern Distributing Co.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.
Zavon Co., Inc.

Fire Doors and Hardware.
Richards-Wilcox Mfg. Co.
Seawell, Luke.
Sanymetal Products Co.
Vonnegut Hardware Co.

Fire Hose.
(See Hose—Fire).

Fire Protecting Paint.
(See Paint).

Fire Sprinkler Systems.
Grinnell Co., Inc.

First Aid Room Equipment.
(See Hospital Equipment).

Flexible Couplings.
Cresson-Morris Co.

Flood Lights—Electric.
Crouse-Hinds Co.
General Electric Co.

Flooring—Hardwood.
Kirkpatrick Lumber & Tim. Co.
Southern Cypress Mfg. Co.

Floor Scrubbing Machine.
American Scrubbing Equip. Co.

Floor Sweeps.
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Fluted Rolls.
Campbell Mfg. Co.
Howard & Bullough.
Perkins & Son, B. F.
Saco-Lowell Shops.
Schofield & Sons, J. S.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Flyers.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Founders.
Cresson-Morris Co.
Lombard Fdry. & Mch. Works.

Fountains—Drinking.
Central Brass Mfg. Co.
Crane Co.
Manufacturing Equipment & Engineering Co.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.

Friction Clutches.
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Fuel.
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Fuses.
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Garage Doors and Door Hardware.
Richards-Wilcox Mfg. Co.
Seawell, Luke.

Garnett Machines.
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.

Gas Engines.
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Gaskets.
Diamond State Fibre Co.
Graton & Knight Mfg. Co.

Gauge Cocks.
Lunkenheimer Co.
Sherwood Mfg. Co.

Gauges—Draft.
Taylor Instrument Co.

Gauges—Mercury Column Vacuum.
Taylor Instrument Co.

Gauge—Oil.
Lunkenheimer Co.

Gauges—Pressure.
Taylor Instrument Co.

Gauges—Recording.
Taylor Instrument Co.

Gauges—Water.
Lunkenheimer Co.

Gears—Silent.
Diamond State Fibre Co.
General Electric Co.
Link-Belt Company.
Morse Chain Co.

Gear Cutting and Cutters.
Cresson-Morris Co.
Whitin Machine Co., D. E.

Gear Pullers.
General Electric Co.

Generators—Electric.
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Glassware and Dishes.
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Governors—Pump.
General Electric Co.

Graphite Products.
Dixon Crucible Co., Jos.

Grates—Boiler.
Detroit Stoker Co.
International Eng. Works.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

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Grease.
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Grease Cups.
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Green Houses.
Hulme, J. S.

Grindstones.
Richards-Wilcox Mfg. Co.

Grinders—Card, Cylinder, Roll, Napper and Garnet.
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Flexible Steel Lacing Co.

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Palmer Co., I. E.

Guider (Cloth-Electric.)
Blake Electric Mfg. Co.

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Guy Anchors.
Crouse-Hinds Co.

Gymnasium Apparatus.
Medart Mfg. Co., Fred.

Hangers.
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Hardware (Building.)
Richards-Wilcox Mfg. Co.
Seawell, Luke.
Sanymetal Products Co.
Vonnegut Hardware Co.

Harness—Loom.
American Supply Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.
Southern Bending Co.

Heads—Bobbin and Spool.
Diamond State Fibre Co.

Heating and Ventilating Apparatus.
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Heating Piping.
Grinnell Co., Inc.

Heddles.
Crompton & Knowles Loom Wks.
Draper Corporation.
Howard Bros. Mfg. Co.
Steel Heddle Mfg. Co.

Heddle Frames.
Crompton & Knowles Loom Wks.
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Curtis Pneumatic Mchry. Co.
Hulme, J. S.
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Collins, J. D.

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Cocker Mach. & Fdry. Co.
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Hospital Equipment.
Thomas Co., F. H.

Hotels.
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Seawell, Luke.

Humidifying Apparatus.
American Blower Co.
Carrier Eng. Corp.
Parks-Cramer Co.
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Humidity Indicating Instruments.
Powers Regulator Co.
Taylor Instrument Co.

Hydraulic Turbines.
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Hydrometers.
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Hygrometers.
Taylor Instrument Co.

Hygrodeiks.
Taylor Instrument Co.

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General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.

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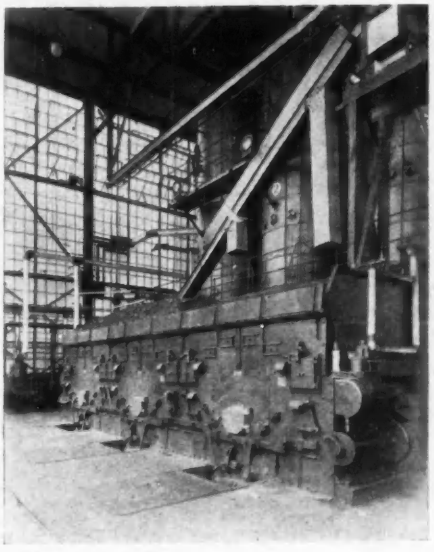

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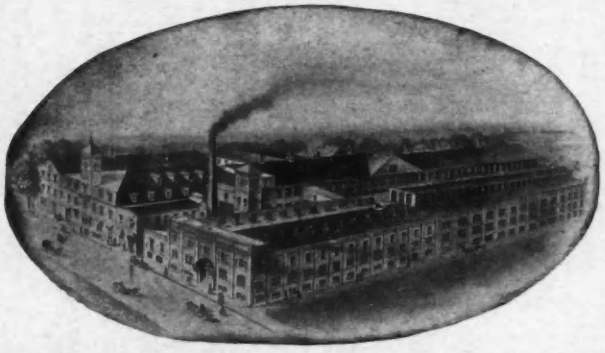

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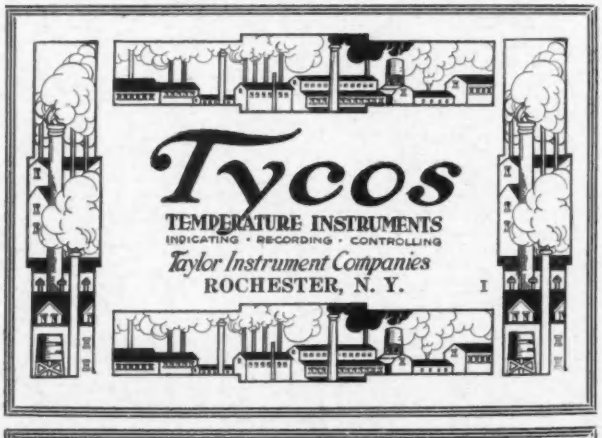

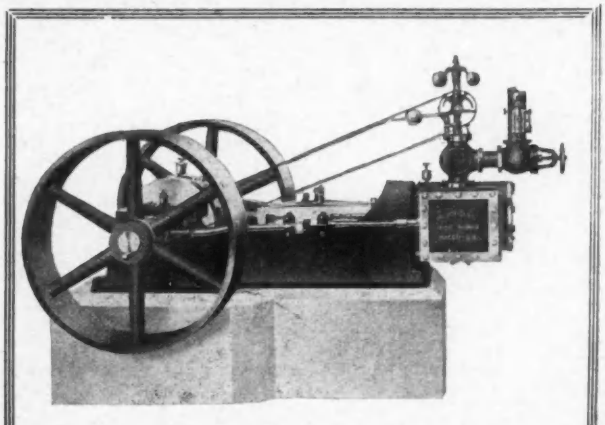

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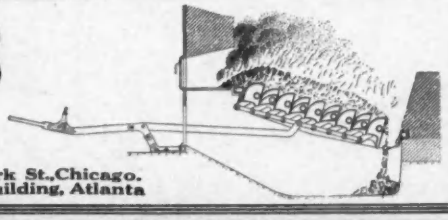

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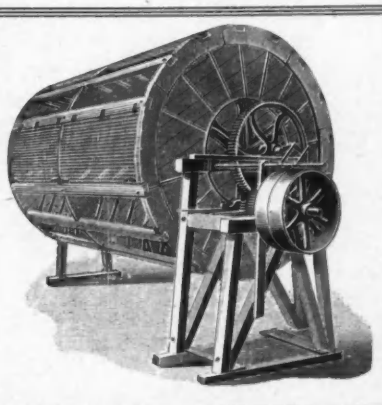

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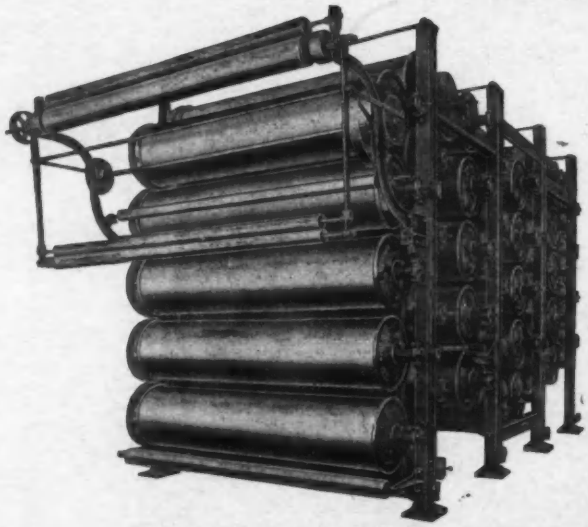

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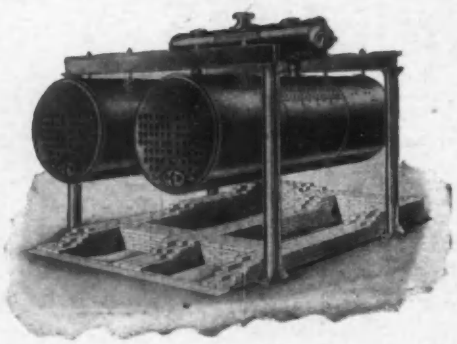

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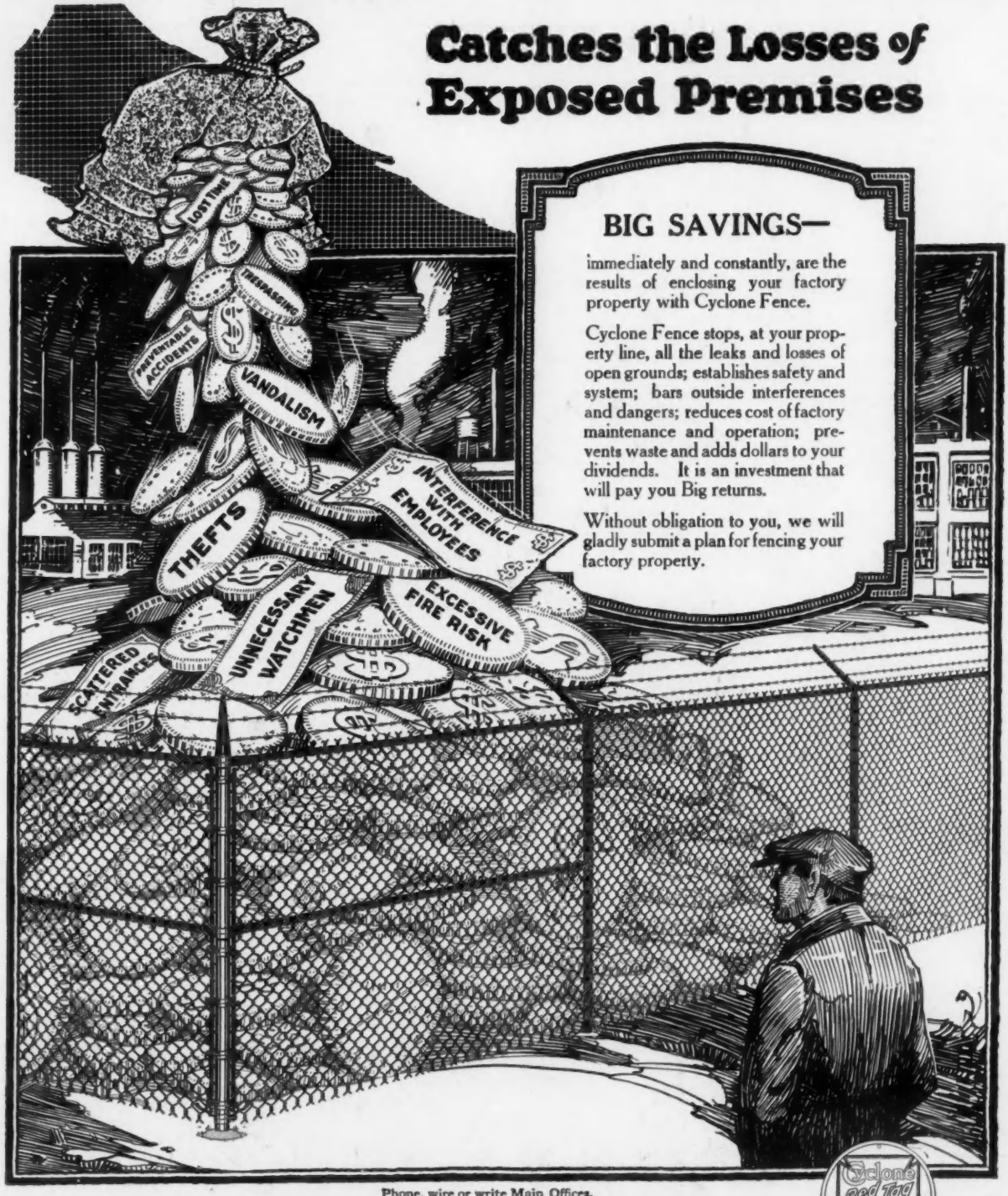

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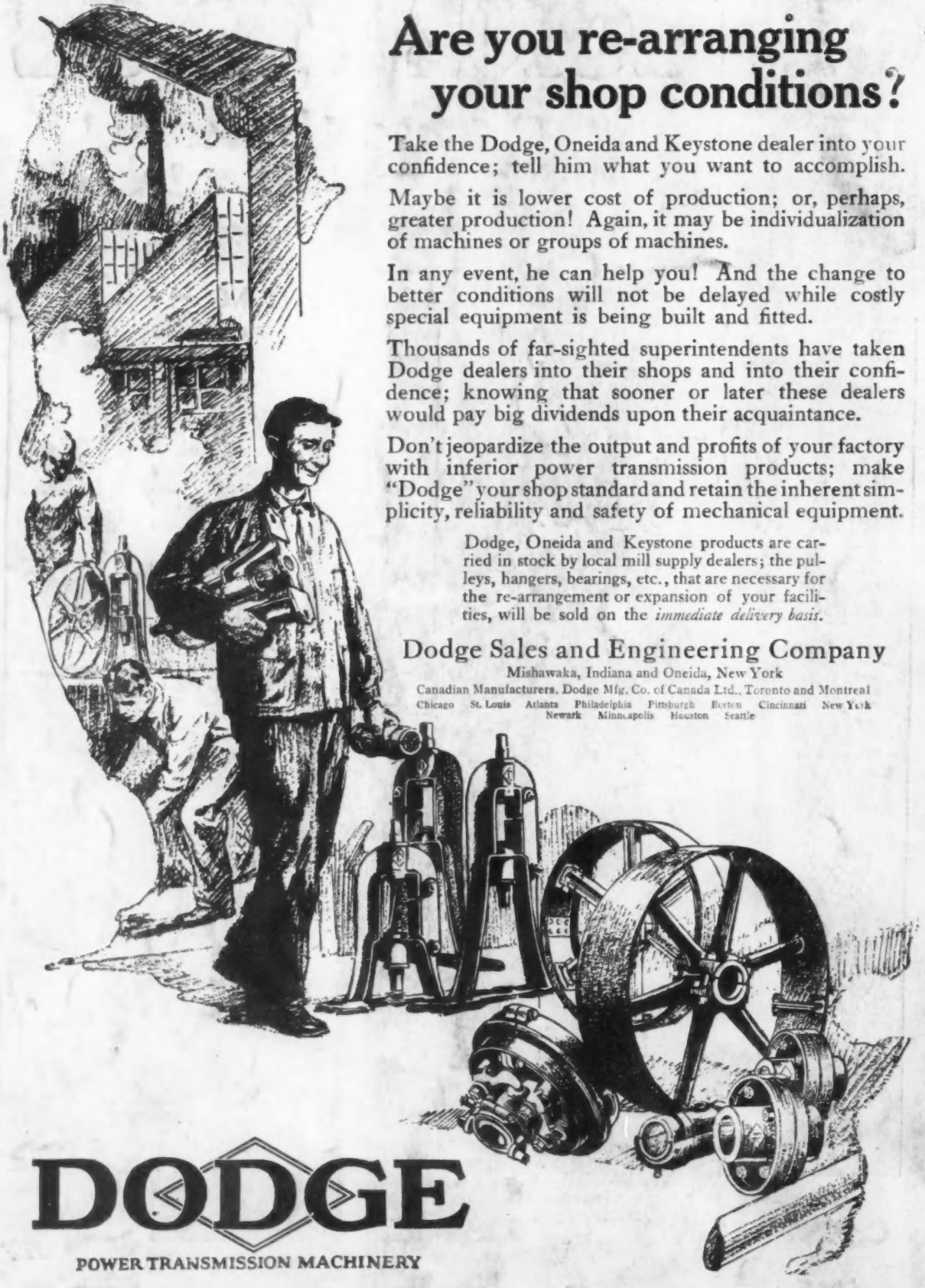

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